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BUREAU OF MINES
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MINERAL RESOURCES
OF THE
UNITED STATES
1926

FRANK J. KATZ
Chief Engineer, Division of Mineral Statistics

PART I—METALS

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Government Publications

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1929

For sale by the Superintendent of Documents, Washington, D. C. - - Price $1.25

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MINERAL RESOURCES OF THE UNITED STATES, 1926—PART I

THE MINERAL RESOURCES OF THE UNITED STATES IN 1926[1]

INTRODUCTION

By Frank J. Katz

Chief Engineer, Division of Mineral Statistics

This statistical summary of the quantity and value of mineral products in the United States for the calendar year 1926, with comparative figures for preceding years and supplemental data on imports and exports, helps to gauge the size and growth of the mineral industries. The importance to the modern world of these industries and the extraordinary dependence of our economic civilization upon them are not indicated, however, by their physical volume or their money value. Better appreciation of their importance is developed, for example, by realizing that the mineral raw materials of domestic origin constitute more than half, and, plus the products thereof in the first stages of manufacture, more than two-thirds of the freight handled by the railroads of the country; that steel, which supplies the framework and the thews of our body economic as well as politic, is the product of the iron-ore and coal mines; and that the supply of energy available and utilized in this country, a vital factor in our industrial supremacy and high standard of living, is nearly 90 per cent derived from mineral fuels.

In 1926 the industries producing minerals in the United States and preparing or reducing them for use were, as a whole, maintained at a higher level of productivity than during 1925, a year of marked prosperity and high records in output. Only a few important products deviated sharply from this general condition, as will be noted below.

Measured by total value of mineral products—$6,212,700,000—the output of 1926 was the next largest ever recorded. Although the corresponding figure for 1920 is $6,981,340,000, price levels have so declined since that year, when they were at their peak, that the real value for 1926 represents at least an appreciable if not a substantial increase over 1920. As compared with the values of the total mineral output for 1923, 1924, and 1925, in which years the average price levels of all commodities were not materially different from those of 1926, increases of 4 per cent, 17 per cent, and 9 per cent, respectively, are indicated.

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[1] In Mineral Resources of the United States the use of leaders (----) indicates that so far as the Bureau of Mines has been able to ascertain there was nothing to report. If data are not available, the fact is indicated by a statement to that effect in a footnote. Leaders are also used in footings where it is quite evident that figures in a column are not addable and in other places where entries are not appropriate.

All figures of imports and exports in this report, unless otherwise stated, were compiled by J. A. Dorsey, of the Bureau of Mines, from records of the Bureau of Foreign and Domestic Commerce, having been converted by Mr. Dorsey to the various units of measurement used in this report and arranged by him in their present form. The imports are those for the calendar year unless otherwise stated. Wherever exports are shown, unless otherwise specified, the figures represent domestic products and not foreign minerals reexported, and they also cover calendar years.

All the mineral fuels were produced in larger quantities in 1926 than in 1925. The total output of bituminous coal closely approximated the war record and exceeded the record made in 1923, a more normal year. The rate of production of bituminous coal was high at the beginning of the year, extraordinarily high during the last quarter, and during midyear was lower only than during the corresponding period of 1923, which was a year of unusually even rate of production. Anthracite production was evenly maintained at a good rate after the strike settlement late in February. The year was otherwise free from domestic coal-mining disturbances. Consumption was high, exports during much of the year were extraordinarily heavy because of the strike in Great Britain, and demand was further augmented by heavy buying for storage. Commercial stocks of soft coal were well maintained throughout the spring and then were steadily augmented to the end of the year in anticipation of a general strike in 1927. Prices in general declined slightly during the first half of the year, recovered gradually to mid-October, then jumped sharply, fell off with equal sharpness after mid-November, and at the end of the year were higher than at the beginning.

A new record in the output of crude petroleum was attained by gradual increase throughout the year; nevertheless stocks of crude petroleum were considerably reduced throughout the year, thus reflecting the growing refinery throughput and heavier demand for refined products. Prices in general were above those for 1925. Increases in the production of natural gas and its coproducts natural-gas gasoline and carbon black are recorded for 1926.

The aggregate value of the output of metals in the United States in 1926 showed a small increase over 1925. Among the metals of major importance the most notable large increase was shown by zinc, whereas gold and silver showed notable decreases. The production of gold continued the decline which set in about 1916. The average price of silver in the United States in 1926 was 7 cents an ounce less than in 1925, causing a decrease of about one-seventh in the total value and a smaller but appreciable decrease in the quantity produced.

The domestic production of copper increased moderately. Imports of copper into the United States were larger, whereas the slackening of foreign demand is indicated by smaller exports. A marked increase in domestic demand was, however, insufficient to offset these factors, and domestic stocks increased. The price trend was very slightly downward.

The lead and zinc industry in 1926 was characterized by record production, intense activity, high prosperity, and excellent demand, although price levels were slightly lower than in 1925 and declined during the year.

In magnitude of production the iron and steel industry recorded a remarkable year in 1926. The production of steel was the largest ever recorded, and the production of pig iron was only a little less than in 1923, the record year. The output of iron ore was notably greater than in 1925 but still well below 1917, the banner year. The average price of ore for 1926 was virtually the same as in 1925. Prices for iron and steel were slightly lower, however, and consumption slightly higher.

The outstanding features with respect to manganese in 1926 were the smaller domestic production of high-grade ores, the extraordinary figures for the production of ferromanganese based on imported ores, the stable demand for manganese and manganese products, and the downward tendency of prices. The domestic production of mercury also decreased, but larger imports indicated corresponding increases in consumption, and prices rose materially during the year. There was virtually no production of chromite in the United States in 1926, but important increases in imports and the growing use of chromite as a refractory material are noted. Antimony mining and smelting in the United States in 1926 was at low ebb, despite the growing demand, which was met by increased imports from Mexico and Bolivia in addition to the Chinese supply. Prices were lower than in the preceding year. Aluminum was produced in the United States during the year at about the same rate as in 1925; there was also little change in price.

The moderate increase shown in the aggregate value of the output of metals was paralleled by a similar increase in the total value of nonmetallic mineral products, not including fuels, in 1926 as compared with that of 1925. The aggregate volume of production of mineral structural materials, including building stone, crushed stone, sand and gravel, lime, gypsum, and cement, indicated that the demand for structural materials in 1926 had changed but slightly as compared with 1925. The average values of these materials changed little during the two years. The output of building stone and crushed stone, considered separately, increased somewhat, whereas the production of sand and gravel, etc., for concrete aggregate, and of lime and gypsum was about the same. Portland cement was produced in larger volume in 1926 than in 1925. Although sales of cement were larger than in the preceding year, they were less than production; producers, therefore, accumulated stocks of finished cement in unprecedented amounts.

Among the ceramic materials, feldspar alone showed material increase in 1926 over 1925 and established a new high record. Clay declined slightly in output; the total, however, remained higher than in other years before 1925. The mineral chemical materials, including fertilizers, pigments, metallurgical fluxes, and refractories in general, showed little change or small decreases in 1926. Fluorspar, however, was an exception with material increase in the quantity and value of production marketed. Among the miscellaneous general industrial minerals, such as graphite, abrasive materials, fuller's earth, mica, asbestos, and talc and soapstone, moderate increases in production were largely the rule in 1926, with demand and prices generally well sustained at the 1925 levels.

STATISTICAL SUMMARY

By Martha B. Clark

GENERAL TABLES

Mineral products of the United States, 1925–26 [1]

Product	1925		1926	
	Quantity	Value	Quantity	Value
METALLIC				
Aluminum .... pounds	....	$36,430,000	....	$37,583,000
Antimonial lead [2] ... short tons (2,000 pounds)	19,667	3,785,547	22,524	3,916,714
Antimony [3] .... do	2,624	918,400	2,693	856,400
Bauxite .... long tons (2,240 pounds)	316,540	1,988,250	392,250	2,415,200
Cadmium .... pounds	502,824	276,553	810,428	429,527
Chromite .... long tons	108	2,105	141	2,079
Copper,[4] sales value .... pounds	1,674,869,886	237,832,000	1,739,622,094	243,547,000
Ferro-alloys .... long tons	616,222	53,048,100	689,258	61,368,407
Gold [5] .... troy ounces	2,411,987	49,860,200	2,335,042	48,269,600
Iron:				
Ore [6] .... long tons	63,924,763	[6] 160,796,886	69,292,832	[6] 174,015,645
Pig .... do	36,814,702	739,316,333	38,181,053	749,633.468
Lead (refined),[4] sales value .... short tons	654,921	113,956,000	680,685	108,910,000
Manganese ore (35 per cent or more Mn) .... long tons	98,324	1,857,769	46,258	1,228,663
Manganiferous ore (5 to 35 per cent Mn)[7] .... long tons	1,448,054	3,752,486	1,217,431	3,138,489
Mercury:				
Metal .... flasks (75 pounds net)	9,174	762,616	7,642	702,323
Ore .... short tons	65,000	(8)	51,000	(8)
Nickel (value at New York City) .... do	272	169,664	323	234,558
Ores (crude), tailings, etc.:				
Copper .... do	53,262,000	(8)	57,636,000	(8)
Copper-lead and copper-lead-zinc .... do	229,000	(8)	282,000	(8)
Dry and siliceous (gold and silver) .... do	8,995,000	(8)	8,743,000	(8)
Lead .... do	8,560,000	(8)	8,358,000	(8)
Lead-zinc .... do	17,741,000	(8)	19,093,000	(8)
Zinc .... do	3,411,000	(8)	4,139,000	(8)
Platinum and allied metals (value at New York City) .... troy ounces	49,643	5,661,809	84,981	9,210,669
Silver .... do	66,155,424	45,911,864	62,718,746	39,136,497
Tin (metallic equivalent) .... short tons	14	15,980	8	10,400
Titanium ore:				
Ilmenite .... do	5,566	89,000	(9)	(9)
Rutile .... do	46	11,000	(9)	(9)
Tungsten ore (60 per cent concentrates) .... do	1,191	755,500	1,382	920,400
Uranium and vanadium ores .... do	13,070	331,000	21,624	329,000
Zinc,[4] sales value .... do	555,631	84,456,000	611,991	91,799,000
Total value of metallic products (approximate)	....	1,380,280,000	....	1,402,920,000

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[1] In this general statement certain of the figures represent shipments rather than quantity mined. The reader is referred to the following sections on the various mineral products for information in greater detail than it seems practicable to give here.

[2] From both domestic and foreign ores.

[3] Figures represent antimony content of antimonial lead. Value excluded from metallic total as the value of the antimony is included in the antimonial lead value. Value for antimony other than that in antimonial lead is included in metallic total; Bureau of Mines not at liberty to publish figures.

[4] Product from domestic ores only.

[5] Value, $20.671834625323 an ounce.

[6] Value not included in total value.

[7] Including ore used for fluxing. For separation see p. A63.

[8] Figures showing values not available.

[9] Value included in total value of metallic products. Bureau of Mines not at liberty to publish figures. For production in Florida see p. A92.

Mineral products of the United States, 1925–26—Continued

Product	1925		1926	
	Quantity	Value	Quantity	Value
NONMETALLIC				
Arsenious oxide.......short tons..	12,317	$1,199,247	11,805	$674,350
Asbestos.......do....	1,258	51,700	1,358	134,731
Asphalt:				
Native.......do....	584,850	4,148,400	715,180	4,484,960
Oil [6].......do....	1,206,700	[6] 15,305,760	1,245,160	[6] 15,452,940
Barite (crude).......do....	228,063	1,703,097	237,875	1,773,293
Borates (colemanite and naturally occurring sodium borate).......short tons..	113,700	3,085,660	115,970	3,128,110
Bromine.......pounds..	1,566,120	488,406	1,245,760	426,837
Calcium-magnesium chloride.......short tons..	67,870	1,386,639	82,340	1,710,405
Cement.......barrels (376 pounds net)..	159,046,937	281,075,691	164,218,941	280,785,583
Clay:				
Products [10].......	....	423,446,917	....	430,428,494
Raw [6].......short tons..	4,030,420	[6] 12,736,632	3,967,198	[6] 14,105,589
Coal:				
Bituminous [11].......do....	520,052,741	1,060,402,000	573,366,985	1,183,412,000
Pennsylvania anthracite.......long tons..	55,193,883	327,664,512	75,390,582	474,164,252
Coke [6].......short tons..	51,266,943	[6] 262,559,137	56,865,537	[6] 307,773,402
Diatomite and tripoli.......do....	102,418	1,357,167	118,495	1,605,173
Emery.......do....	769	5,907	386	3,641
Feldspar (crude).......long tons..	185,706	1,315,654	209,989	1,607,101
Fluorspar.......short tons..	113,669	2,052,342	128,657	2,341,277
Fuller's earth.......do....	206,574	2,923,965	234,152	3,356,482
Garnet for abrasive purposes.......do....	8,429	712,853	6,397	523,875
Gems and precious stones.......	....	(12)	....	(12)
Graphite:				
Amorphous.......short tons..	3,536	39,640	2,975	40,500
Crystalline.......pounds..	2,257,250	56,721	4,989,200	178,842
Grindstones and pulpstones.......short tons..	37,340	1,705,939	38,339	1,873,234
Gypsum.......do....	5,678,302	47,577,240	5,635,441	46,721,219
Lime.......do....	4,580,823	42,609,141	4,560,398	41,566,452
Magnesite (expressed as equivalent crude).......short tons..	120,660	1,432,700	133,500	1,200,830
Mica:				
Scrap.......do....	9,695	173,537	7,043	136,643
Sheet.......pounds..	1,793,865	321,962	2,172,159	400,184
Millstones.......	....	22,490	....	45,937
Mineral paints:				
Natural pigments [13].......short tons..	(13)	(13)	(13)	(13)
Zinc and lead pigments [14].......do....	199,190	28,310,631	184,289	25,896,269
Mineral waters.......gallons sold..	(12)	(12)	(12)	(12)
Natural gas.......M cubic feet..	1,188,571,000	265,271,000	1,313,019,000	299,238,000
Natural-gas gasoline.......gallons..	1,127,470,000	120,383,000	1,363,090,000	136,412,000
Oilstones, etc.......short tons..	970	272,224	1,680	223,359
Peat.......do....	72,436	452,898	61,936	364,413
Petroleum.......barrels (42 gallons)..	763,743,000	1,284,960,000	770,874,000	1,447,760,000
Phosphate rock.......long tons..	3,481,819	11,545,678	3,209,976	10,893,800
Potassium salts.......short tons..	[15] 25,802	1,204,024	[15] 25,060	1,083,064
Pumice.......do....	40,380	179,020	53,887	208,504
Pyrites.......long tons..	170,081	650,448	166,559	616,668
Salt.......short tons..	7,397,500	26,162,361	7,371,600	25,055,012
Sand:				
Glass.......do....	2,334,921	3,836,085	2,274,218	3,615,371
Molding, building, etc., and gravel..do....	169,666,552	103,706,038	180,826,600	107,723,330
Sand-lime brick [10].......thousands..	315,595	3,780,639	330,586	3,981,492
Silica (quartz).......short tons..	25,444	205,376	27,743	274,333
Slate.......do....	724,600	12,575,326	718,000	12,352,767
Stone.......do....	115,851,370	174,216,792	124,496,360	188,308,590
Sulphur.......long tons..	1,858,003	29,000,000	2,072,657	37,300,000
Sulphuric acid (60° Baumé) from copper and zinc smelters.......short tons..	1,006,915	7,512,568	1,068,449	8,274,242
Talc and soapstone [16].......do....	182,256	2,011,793	181,568	2,110,994
Total value of nonmetallic products (approximate).......	....	4,291,100,000	....	4,802,180,000

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[6] Value not included in total value.

[10] Figures obtained through cooperation with Bureau of the Census.

[11] Includes brown coal and lignite, and anthracite mined elsewhere than in Pennsylvania.

[12] No canvass. Estimate of value included in total value of nonmetallic products.

[13] Canvass discontinued after 1915. Value of iron ore sold for paint included under last item ("Unspecified").

[14] Sublimed blue lead, sublimed white lead, leaded zinc oxide, and zinc oxide.

[15] K_2O content.

[16] Figures represent talc only. Value of soapstone is included in total value of nonmetallic products; Bureau of Mines not at liberty to publish figures.

Mineral products of the United States, 1925–26—Continued

Product	1925		1926	
	Quantity	Value	Quantity	Value
SUMMARY				
Total value of metallic products		$1,380,280,000		$1, 402, 920, 000
Total value of nonmetallic products (exclusive of mineral fuels)		1, 232, 420, 000		1, 261, 200, 000
Total value of mineral fuels		3, 058, 680, 000		3, 540, 980, 000
Total value of "unspecified" (metallic and nonmetallic) products (partly estimated) [17]		6, 250, 000		[17] 7, 600, 000
Grand total approximate value of mineral products		5, 677, 630, 000		6, 212, 700, 000

[17] Includes for 1926 the value of bismuth, cadmium sulphide and other cadmium compounds, chats ($548,540), columbite ($650), flint lining for tube mills and pebbles for grinding ($85,146), iron ore sold for magnets, iron ore sold for paint ($129,541), lithium minerals ($53,400), natural magnesium chloride ($701,580), natural magnesium sulphate ($339,220), calcareous marl ($146,094), greensand marl ($174,740), mica schist, mineral soap, molybdenum, selenium ($438,132), silica sand and sandstone (finely ground) ($1,398,473), sodium salts (carbonate, bicarbonate, sulphate, and trona) from natural sources ($1,321,640), tellurium ($2,229), zircon ($180,880), and an estimate of the value of miscellaneous mineral products, statistics for which are not collected annually by the Bureau of Mines.

Value of mineral products of the United States, 1880–1926

Year	Metallic		Nonmetallic		Unspecified (metallic and nonmetallic)	Total	
	Value	Percentage of increase or decrease	Value	Percentage of increase or decrease		Value	Percentage of increase or decrease
1880	$187,881,000	----------	$173,582,000	----------	$6,000,000	$367,463,000	--------
1881	189,413,000	+0.8	207,207,000	+19	6,500,000	403,120,000	+10
1882	215,820,000	+14	230,786,000	+11	6,500,000	453,106,000	+12
1883	197,881,000	−8	243,680,000	+6	6,500,000	448,061,000	−1
1884	180,284,000	−9	221,756,000	−9	5,000,000	407,040,000	−9
1885	172,218,000	−4	242,333,000	+9	5,000,000	419,551,000	+3
1886	204,400,000	+19	250,995,000	+4	790,000	456,185,000	+9
1887	240,791,000	+18	294,057,000	+17	785,000	535,633,000	+17
1888	242,010,000	+.5	310,889,000	+6	900,000	553,799,000	+3
1889	250,325,000	+3	291,004,000	−6	997,000	542,326,000	−2
1890	303,440,000	+21	310,995,000	+7	994,000	615,429,000	+13
1891	280,485,000	−8	319,364,000	+3	1,000,000	600,849,000	−2
1892	283,715,000	+1	337,517,000	+6	1,000,000	622,232,000	+4
1893	223,154,000	−21	321,339,000	−5	1,000,000	545,493,000	−12
1894	186,835,000	−16	362,410,000	+13	1,000,000	550,245,000	+.9
1895	248,033,000	+33	393,658,000	+9	1,000,000	642,691,000	+17
1896	252,075,000	+2	387,966,000	−1	1,000,000	641,041,000	−.3
1897	269,934,000	+7	380,678,000	−2	1,000,000	651,612,000	+2
1898	308,247,000	+14	417,795,000	+10	1,000,000	727,042,000	+12
1899	483,521,000	+57	525,575,000	+26	1,000,000	1,010,096,000	+39
1900	513,732,000	+6	594,204,000	+13	1,000,000	1,108,936,000	+10
1901	493,314,000	−4	660,764,000	+11	1,000,000	1,155,078,000	+4
1902	604,517,000	+23	722,434,000	+9	1,000,000	1,327,951,000	+15
1903	588,753,000	−3	905,628,000	+25	1,000,000	1,495,381,000	+13
1904	501,114,000	−15	857,667,000	−5	400,000	1,359,181,000	−9
1905	702,585,000	+40	920,780,000	+7	400,000	1,623,765,000	+19
1906	886,180,000	+26	1,014,500,000	+10	200,000	1,900,880,000	+17
1907	904,108,000	+2	1,165,376,000	+15	86,000	2,069,570,000	+9
1908	550,768,000	−39	1,040,761,000	−11	244,000	1,591,773,000	−23
1909	754,944,000	+37	1,131,866,000	+9	297,000	1,887,107,000	+19
1910	749,879,000	−.7	1,237,668,000	+9	297,000	1,987,844,000	+5
1911	680,907,000	−9	1,242,942,000	+.4	232,000	1,924,081,000	−3
1912	862,008,000	+27	1,375,420,000	+11	366,000	2,237,794,000	+16
1913	878,869,000	+2	1,554,298,000	+13	378,000	2,433,545,000	+9
1914	686,639,000	−22	1,424,063,000	−8	470,000	2,111,172,000	−13
1915	991,730,000	+44	1,400,484,000	−2	2,430,000	2,394,644,000	+13
1916	1,620,745,000	+63	1,884,413,000	+35	3,281,000	3,508,439,000	+47
1917	2,086,234,000	+29	2,900,462,000	+54	5,800,000	4,992,496,000	+42
1918	2,153,318,000	+3	3,380,690,000	+17	6,700,000	5,540,708,000	+11
1919	1,359,744,000	−37	3,232,626,000	−4	3,400,000	4,595,770,000	−17
1920	1,762,350,000	+30	5,214,170,000	+61	4,820,000	6,981,340,000	+52
1921	654,130,000	−63	3,481,720,000	−33	2,650,000	4,138,500,000	−41
1922	987,180,000	+51	3,656,410,000	+5	3,700,000	4,647,290,000	+12
1923	1,510,930,000	+53	4,471,620,000	+22	3,950,000	5,986,500,000	+29
1924	1,232,330,000	−18	4,067,730,000	−9	5,740,000	5,305,800,000	−11
1925	1,380,280,000	+12	4,291,100,000	+5	6,250,000	5,677,630,000	+7
1926	1,402,920,000	+2	4,802,180,000	+12	7,600,000	6,212,700,000	+9
Grand total	32,420,670,000	----------	64,855,562,000	----------	112,657,000	97,388,889,000	--------

Value of mineral products of the United States, 1922–1926, by States [1]

State	1922	1923	1924	1925	1926
Alabama	$61, 723, 268	$82, 496, 430	$77, 315, 758	$77, 139, 340	$83, 709, 894
Alaska	19, 506, 610	20, 241, 137	17, 361, 834	18, 286, 320	17, 606, 890
Arizona	63, 737, 720	104, 940, 213	100, 327, 062	114, 202, 670	115, 047, 987
Arkansas	31, 418, 633	41, 954, 319	61, 748, 999	87, 185, 532	84, 485, 672
California	283, 411, 997	375, 492, 868	428, 175, 652	496, 923, 376	523, 352, 257
Colorado	54, 806, 277	61, 379, 146	61, 487, 882	63, 512, 998	65, 597, 487
Connecticut	5, 346, 295	7, 177, 266	8, 129, 332	6, 755, 454	7, 695, 341
Delaware	428, 314	416, 074	512, 105	539, 261	375, 945
District of Columbia	869, 132	929, 768	813, 608	954, 795	987, 289
Florida	10, 907, 718	12, 557, 822	13, 120, 295	16, 650, 659	19, 752, 202
Georgia	11, 120, 018	14, 300, 313	14, 946, 610	16, 503, 741	17, 479, 967
Idaho	18, 495, 628	27, 105, 344	27, 831, 623	31, 611, 166	31, 752, 821
Illinois	244, 617, 561	282, 760, 623	235, 796, 027	231, 658, 604	237, 241, 600
Indiana	108, 394, 095	130, 885, 954	112, 299, 075	111, 833, 732	118, 692, 304
Iowa	36, 205, 251	46, 174, 897	40, 459, 869	38, 420, 203	35, 971, 787
Kansas	103, 884, 561	110, 630, 255	105, 005, 476	142, 944, 214	165, 060, 612
Kentucky	158, 701, 496	148, 853, 786	120, 510, 775	131, 370, 840	146, 768, 273
Louisiana	75, 519, 328	61, 199, 048	56, 930, 681	60, 503, 891	62, 203, 543
Maine	5, 588, 140	7, 565, 553	6, 035, 160	5, 838, 718	5, 785, 619
Maryland	14, 905, 227	21, 189, 542	18, 506, 867	21, 557, 810	24, 066, 996
Massachusetts	11, 004, 523	14, 781, 129	15, 725, 882	16, 831, 529	16, 786, 577
Michigan	101, 430, 981	128, 291, 450	114, 239, 386	122, 212, 254	130, 860, 609
Minnesota	111, 617, 448	174, 105, 328	107, 844, 680	110, 252, 956	118, 361, 306
Mississippi	1, 600, 393	2, 163, 343	2, 090, 422	2, 171, 945	1, 882, 986
Missouri	62, 402. 642	79, 201, 473	81, 054, 122	92, 548, 473	90, 003, 537
Montana	59, 400, 591	74, 707, 269	70, 631, 806	79, 261, 284	79, 762, 630
Nebraska	2, 996, 587	3, 302, 397	3, 209, 425	3, 358, 585	3, 322, 460
Nevada	18, 374, 023	28, 598, 627	26, 225, 943	26, 469, 901	27, 613, 232
New Hampshire	2, 283, 119	3, 572, 615	3, 378, 165	3, 464, 837	4, 144, 645
New Jersey	62, 396, 379	72, 602, 066	75, 271, 009	76, 761, 313	77, 065, 713
New Mexico	18, 038, 022	23, 791, 047	23, 913, 528	25, 696, 009	28, 513, 991
New York	73, 527, 880	89, 975, 134	95, 435, 299	102, 035, 557	112, 016, 262
North Carolina	7, 268, 381	10, 020, 559	9, 261, 467	9, 504, 063	10, 992, 793
North Dakota	3, 693, 095	3, 473, 018	2, 735, 477	2, 662, 029	2, 804, 837
Ohio	236, 808, 638	287, 868, 728	249, 049, 648	247, 506, 588	253, 883, 995
Oklahoma	369, 069, 612	398, 810, 630	393, 030, 665	501, 767, 118	569, 518, 693
Oregon	5, 489, 956	6, 054, 487	7, 364, 232	7, 826, 711	6, 941, 355
Pennsylvania	823, 148, 222	1, 225, 036, 404	1, 011, 630, 879	867, 196, 142	1, 055, 766, 077
Rhode Island	770, 966	1, 022, 528	1, 132. 641	1, 151, 857	1, 339, 398
South Carolina	2, 414, 346	3, 550, 059	3, 444, 366	3, 507, 804	3, 677, 209
South Dakota	7, 278, 934	7, 372, 368	6, 925, 676	7, 971, 650	7, 595, 358
Tennessee	35, 146, 266	41, 553, 789	35, 354, 525	38, 869, 198	39, 296, 668
Texas	249, 604, 173	260, 450, 913	272, 729, 023	351, 211, 629	420, 586, 730
Utah	60. 697, 116	86, 221, 000	84, 356, 626	100, 275, 442	98, 985, 218
Vermont	9, 576, 636	13, 910, 449	14, 549, 429	14, 408, 933	14, 955, 161
Virginia	38, 551, 479	48, 052, 018	37, 962, 143	41, 038, 393	46, 136, 458
Washington	19, 725, 303	22, 169, 191	21, 150, 370	22, 382, 132	21, 256, 952
West Virginia	358, 772, 116	412, 866, 535	307, 314, 205	333, 527, 697	395, 941, 940
Wisconsin	13, 822, 883	19, 089, 600	15, 796, 720	19, 205, 380	20, 711, 736
Wyoming	58, 529, 284	77, 664, 547	75, 494, 166	78, 754, 915	78, 988, 066

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[1] In this table iron ore, not pig iron, is taken as the basis of valuation of iron, and in the case of other metals mine production (recoverable content of metals) is the basis.

Mineral products of the United States and principal producing States in 1926

Rank in value	Product	Principal producing States [1]	
		In order of quantity	In order of value
20	Aluminum		New York, Tennessee, North Carolina.
33	Antimonial lead	Not separable by States	Not separable by States.
84	Antimony ore	Idaho	Rank same as for quantity.
54	Arsenious oxide	Montana, Utah	Do.
75	Asbestos	Georgia, Arizona, Maryland	Arizona, Georgia, Maryland.
	Asphalt:		
31	Native	Kentucky, Texas, Utah, Oklahoma	Kentucky, Utah, Texas, Oklahoma.
24	Oil	Not separable by States	Not separable by States.
42	Barite (crude)	Missouri, Georgia, Tennessee, Virginia	Rank same as for quantity.
38	Bauxite	Arkansas, Georgia, Tennessee	Do.
(2)	Bismuth	Not separable by States	Not separable by States.
37	Borates	California, Nevada	Rank same as for quantity.
29	Briquets, fuel	Wisconsin, Pennsylvania, Washington, Virginia	Wisconsin, Pennsylvania, Oregon, Washington.
62	Bromine	Michigan, West Virginia	Rank same as for quantity.
56	Cadmium (metal and compounds)	Not separable by States	Not separable by States.
43	Calcium-magnesium chloride (natural)	Michigan, West Virginia, California, Ohio	Michigan, West Virginia, Ohio, Oklahoma.
7	Cement	Pennsylvania, Indiana, California, Michigan	Pennsylvania, California, Indiana, Michigan.
57	Chats	Missouri, Oklahoma, Kansas	Rank same as for quantity.
86	Chromite	California, Maryland	Maryland, California.
4	Clay products		Ohio, Pennsylvania, New Jersey, Illinois.
25	Clay, raw	Pennsylvania, Missouri, New Jersey, Ohio	Pennsylvania, Missouri, New Jersey, Georgia.
1	Coal:		
	Bituminous	Pennsylvania, West Virginia, Illinois, Kentucky	Rank same as for quantity.
	Pennsylvania anthracite	Pennsylvania	Do.
5	Coke	Pennsylvania, Ohio, Indiana, Alabama	Pennsylvania, Indiana, Ohio, Illinois.
87	Columbite	South Dakota	Rank same as for quantity.
8	Copper	Arizona, Utah, Montana, Michigan	Do.
45	Diatomite and tripoli	California, Illinois, Missouri, Oklahoma	Do.
83	Emery	New York	Do.
44	Feldspar (crude)	North Carolina, Maine, New Hampshire, New York	Do.
15	Ferro-alloys	Pennsylvania, Ohio, New York, Iowa	Pennsylvania, New York, Ohio, Alabama.
77	Flint lining for tube mills	South Dakota, Minnesota	Rank same as for quantity.
39	Fluorspar	Kentucky, Illinois, Colorado, New Mexico	Do.
34	Fuller's earth	Georgia, Florida, Illinois, Texas	Do.
60	Garnet, abrasive	New York, New Hampshire	Do.
(2)	Gems and precious stones	No canvass for 1926	No canvass for 1926.
16	Gold	California, Colorado, Alaska, South Dakota	Rank same as for quantity.
70	Graphite		Texas, Alabama, Rhode Island, Michigan.
	Amorphous	Rhode Island, Michigan, Nevada	Rank same as for quantity.
	Crystalline	Texas, Alabama	Do.

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[1] Rank of States in metal production (except aluminum, ferro-alloys, and pig iron) arranged according to mine reports, not smelter output.

[2] No canvass for 1926.

Mineral products of the United States and principal producing States in 1926—Continued

Rank in value	Product	Principal producing States	
		In order of quantity	In order of value
41	Grindstones and pulpstones	Ohio, West Virginia, Michigan, Washington	Rank same as for quantity.
17	Gypsum	New York, Iowa, Michigan, Texas	New York, Iowa, Ohio, Michigan.
10	Iron ore	Minnesota, Michigan, Alabama, Wisconsin	Rank same as for quantity.
3	Iron, pig	Pennsylvania, Ohio, Indiana, Illinois	Pennsylvania, Ohio, Illinois, Indiana.
13	Lead	Missouri, Utah, Idaho, Oklahoma	Rank same as for quantity.
18	Lime	Ohio, Pennsylvania, West Virginia, Missouri	Ohio, Pennsylvania, Massachusetts, Missouri.
79	Lithium minerals	New Mexico, South Dakota, California	Rank same as for quantity.
48	Magnesite (crude)	Washington, California	California, Washington.
63	Magnesium	Michigan, New York	Rank same as for quantity.
53	Magnesium chloride (natural)	Michigan, California	Do.
65	Magnesium sulphate (natural)	Michigan, Washington, California	Do.
	Manganese ore	Montana, Virginia, Georgia, Washington	Montana, Virginia, Arkansas, Washington.
36	Manganiferous ore	Minnesota, Michigan, New Mexico, Georgia	Rank same as for quantity.
59	Manganiferous zinc residuum	New Jersey	Do.
	Marl:		
74	Calcareous	Virginia, West Virginia, California, South Carolina	Do.
73	Greensand	New Jersey, Delaware, Texas	Do.
52	Mercury	California, Texas, Washington, Nevada	Do.
58	Mica	North Carolina, New Hampshire, New Mexico, South Dakota	New Hampshire, North Carolina, New Mexico, South Dakota.
	Scrap	do	Rank same as for quantity.
	Sheet	New Hampshire, North Carolina, New Mexico, Georgia	New Hampshire, North Carolina, Georgia, New Mexico.
80	Millstones		New York, Virginia, New Hampshire, North Carolina.
22	Mineral paints, zinc and lead pigments	Pennsylvania, Ohio, Illinois, Colorado	Pennsylvania, Ohio, Illinois, Missouri.
(2)	Mineral waters	No canvass for 1926	No canvass for 1926.
49	Molybdenum	Colorado, New Mexico	Rank same as for quantity.
6	Natural gas	Oklahoma, California, West Virginia, Texas	West Virginia, Pennsylvania, Oklahoma, California.
11	Natural-gas gasoline	Oklahoma, California, Texas, West Virginia	California, Oklahoma, Texas, West Virginia.
68	Nickel	Not separable by States	Not separable by States.
69	Oilstones, etc	Ohio, Indiana, New Hampshire, Arkansas	Arkansas, Indiana, Ohio, New Hampshire.
64	Peat	New Jersey, Illinois, California, Indiana	New Jersey, Illinois, California, Michigan.
81	Pebbles for grinding	South Dakota, Minnesota, California	Rank same as for quantity.
2	Petroleum	California, Oklahoma, Texas, Arkansas	Oklahoma, California, Texas, Kansas.
27	Phosphate rock	Florida, Tennessee, Idaho, Kentucky	Rank same as for quantity.
28	Platinum and allied metals	Alaska, California, Oregon	Do.
50	Potassium salts	California, Maryland, Utah, Pennsylvania	California, Maryland, Utah, Delaware.
71	Pumice	Kansas, Nebraska, California, Arizona	Rank same as for quantity.
55	Pyrites	California, Virginia, New York, Ohio	Do.
23	Salt	Michigan, New York, Ohio, Kansas	Do.
12	Sand and gravel	New York, Illinois, Michigan, California	Pennsylvania, New York, California, Illinois.
32	Sand-lime brick	Michigan, New Jersey, Massachusetts, Wisconsin	Michigan, New Jersey, Massachusetts, Ohio.

61	Selenium	Not separable by States	Not separable by States.
67	Silica (quartz)	California, Maryland, Wisconsin, Nevada	California, Wisconsin, Maryland, Massachusetts.
46	Silica sand and sandstone (finely ground)	Illinois, Pennsylvania, West Virginia, New Jersey	Rank same as for quantity.
19	Silver	Utah, Montana, Idaho, Arizona	Do.
26	Slate		Pennsylvania, Vermont, New York, Maine.
40	Sodium salts (other than NaCl) from natural sources.	California, Arizona, Wyoming, Washington	California, Arizona, Washington, Wyoming.
9	Stone	Pennsylvania, Ohio, Michigan, New York	Indiana, Pennsylvania, Ohio, New York.
21	Sulphur	Texas, Louisiana, Utah	Rank same as for quantity.
30	Sulphuric acid from copper and zinc smelters	Tennessee, Illinois, Pennsylvania, Ohio	Illinois, Tennessee, Pennsylvania, Ohio.
35	Talc and soapstone	New York, Vermont, Virginia, California	Virginia, New York, Vermont, California.
85	Tellurium	Not separable by States	Not separable by States.
82	Tin	Alaska	Rank same as for quantity.
	Titanium ore:		
76	Ilmenite	Florida, Virginia	Do.
78	Rutile	Virginia, Florida	Do.
51	Tungsten ore	Nevada, California, Colorado, South Dakota	California, Nevada, Colorado, South Dakota.
66	Uranium and vanadium ores	Colorado, Utah, Arizona	Rank same as for quantity.
14	Zinc	Oklahoma, Kansas, New Jersey, Montana	Do.
72	Zircon	Florida	Do.

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[3] No canvass for 1926.

States and their principal mineral products in 1926 [1]

State	Rank	Percentage of total value for United States	Principal mineral products in order of value
Alabama	18	1.52	Coal, iron ore, cement, clay products.
Alaska	34	.32	Copper, gold, coal, silver.
Arizona	13	2.09	Copper, gold, silver, lead.
Arkansas	17	1.53	Petroleum, natural gas, coal, natural-gas gasoline.
California	3	9.51	Petroleum, natural-gas gasoline, natural gas, cement.
Colorado	22	1.19	Coal, gold, lead, petroleum.
Connecticut	39	.14	Clay products, stone, lime, sand and gravel.
Delaware	50	.01	Stone, clay products, sand and gravel, green sand marl.
District of Columbia	49	.02	Sand and gravel, clay products, sand-lime brick, stone.
Florida	33	.36	Phosphate rock, stone, sand and gravel, fuller's earth.
Georgia	35	.32	Clay products, stone, cement, fuller's earth.
Idaho	27	.58	Lead, silver, zinc, stone.
Illinois	7	4.31	Coal, clay products, petroleum, cement.
Indiana	11	2.16	Coal, cement, stone, clay products.
Iowa	26	.65	Coal, cement, gypsum, clay products.
Kansas	8	3.00	Petroleum, zinc, natural gas, coal.
Kentucky	9	2.67	Coal, petroleum, clay products, natural gas.
Louisiana	23	1.13	Petroleum, natural gas, sulphur, natural-gas gasoline.
Maine	42	.10	Stone, lime, slate, clay products.
Maryland	30	.44	Coal, clay products, cement, sand and gravel.
Massachusetts	36	.30	Stone, clay products, sand and gravel, lime.
Michigan	10	2.38	Iron ore, copper, cement, salt.
Minnesota	12	2.15	Iron ore, stone, cement, clay products.
Mississippi	47	.03	Clay products, sand and gravel, stone.
Missouri	16	1.64	Lead, clay products, cement, coal.
Montana	19	1.45	Copper, zinc, petroleum, silver.
Nebraska	45	.06	Clay products, sand and gravel, cement, stone.
Nevada	29	.50	Copper, silver, gold, lead.
New Hampshire	43	.08	Stone, clay products, sand and gravel, feldspar.
New Jersey	21	1.40	Clay products, zinc, cement, stone.
New Mexico	28	.52	Copper, coal, petroleum, zinc.
New York	14	2.04	Clay products, gypsum, cement, stone.
North Carolina	38	.20	Clay products, stone, sand and gravel, feldspar.
North Dakota	46	.05	Coal, sand and gravel, clay products, natural gas.
Ohio	6	4.61	Clay products, coal, natural gas, petroleum.
Oklahoma	2	10.35	Petroleum, natural gas, natural-gas gasoline, zinc.
Oregon	41	.13	Stone, cement, sand and gravel, clay products.
Pennsylvania	1	19.18	Coal, cement, clay products, natural gas.
Rhode Island	48	.02	Stone, clay products, sand and gravel, lime.
South Carolina	44	.07	Clay products, stone, sand and gravel, barite.
South Dakota	40	.14	Gold, cement, stone, sand and gravel.
Tennessee	25	.71	Coal, cement, clay products, stone.
Texas	4	7.64	Petroleum, sulphur, natural gas, natural-gas gasoline.
Utah	15	1.80	Copper, lead, silver, coal.
Vermont	37	.27	Stone, slate, lime, talc.
Virginia	24	.84	Coal, clay products, stone, cement.
Washington	31	.39	Coal, cement, clay products, sand and gravel.
West Virginia	5	7.19	Coal, natural gas, petroleum, clay products.
Wisconsin	32	.38	Stone, zinc, sand and gravel, iron ore.
Wyoming	20	1.43	Petroleum, coal, natural gas, natural-gas gasoline.

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[1] In this table iron ore, not pig iron, is taken as the basis of iron valuation, and in the case of other metals mine production (recoverable content of metals) is the basis.

Prices of silver, copper, lead, and zinc, 1917–1926

Year	Silver [1]	Copper [2]	Lead [2]	Zinc [2]	Year	Silver [1]	Copper [2]	Lead [2]	Zinc [2]
	Per fine ounce	*Per pound*	*Per pound*	*Per pound*		*Per fine ounce*	*Per pound*	*Per pound*	*Per pound*
1917	$0.824	$0.273	$0.086	$0.102	1922	$1.00	$0.135	$0.055	$0.057
1918	.98	.247	.071	.091	1923	.82	.147	.070	.068
1919	1.12	.186	.053	.073	1924	.67	.131	.080	.065
1920	1.09	.184	.080	.081	1925	.694	.142	.087	.076
1921	1.00	.129	.045	.050	1926	.624	.140	.080	.075

[1] Average price furnished by Bureau of the Mint.

[2] Average price, all grades.

DETAILED TABLES

ABRASIVE MATERIALS

Natural abrasives sold by producers in the United States, 1917–1926 [1]

Year	Millstones [2]	Grindstones		Pulpstones [3]		Oilstones and scythestones		Emery	
		Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
1917	$43,489	54,432	$806,896	(4)	$340,888	1,816	$168,704	[5] 17,135	[5] $241,050
1918	92,514	56,554	1,262,602	8,785	513,680	1,010	189,033	[6] 10,422	[6] 112,878
1919	66,972	40,755	993,959	6,110	342,056	1,463	235,943	2,601	23,203
1920	63,325	44,832	1,239,990	8,652	467,014	1,144	231,747	2,327	21,685
1921	24,524	16,310	477,259	10,030	750,063	831	173,025	305	2,250
1922	20,853	21,367	574,900	5,157	445,286	1,016	197,450	1,468	17,511
1923	22,229	37,384	1,008,899	9,186	680,416	1,223	231,812	2,286	29,478
1924	30,125	28,991	852,260	9,193	814,409	1,056	258,943	2,195	19,756
1925	22,490	28,970	864,637	8,370	841,302	970	272,224	769	5,907
1926	45,937	28,669	875,240	9,670	997,994	1,680	223,359	386	3,641

Year	Garnet		Diatomite		Tripoli (including rottenstone)			Pumice		Grinding pebbles and tube-mill lining	
	Short tons	Value	Short tons	Value	Short tons	Value		Short tons	Value	Short tons	Value
						Crude (estimated)	As sold (crude and finished)				
1917	4,995	$198,327	[7] 3,033	$31,368	26,069	$92,416	$338,188	35,293	$84,814	15,050	$131,441
1918	4,696	248,161	[7] 2,965	24,947	19,982	53,815	199,854	30,637	91,178	12,469	129,485
1919	4,944	310,131	42,642	531,960	24,292	98,010	181,541	36,051	116,835	9,448	85,302
1920	5,476	434,425	61,922	1,079,693	40,233	164,076	569,677	41,838	114,433	10,924	77,823
1921	3,048	260,687	55,134	682,616	12,340	53,892	213,013	37,108	158,540	989	14,637
1922	7,054	566,879	44,761	386,669	30,205	105,309	316,728	45,262	175,600	3,159	30,798
1923	9,006	688,437	65,833	699,406	27,082	62,190	382,757	56,575	214,169	4,551	51,795
1924	8,290	674,176	63,163	693,917	28,476	55,537	389,409	43,651	190,253	2,532	37,429
1925	8,429	712,853	73,030	922,281	29,388	58,770	434,886	40,380	179,020	3,831	50,147
1926	6,397	523,875	[8] 87,126	[8] 1,081,564	31,369	65,022	523,609	53,887	208,504	6,219	85,146

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[1] For figures on abrasive feldspar and quartz, see sections on feldspar and silica.

[2] Figures for quantity not available.

[3] Exclusive of sales in Washington prior to 1923.

[4] Figures not available.

[5] Includes 820 short tons of corundum, valued at $67,461.

[6] Includes corundum for which figures may not be published.

[7] Exclusive of considerable production for special uses upon which the Bureau of Mines is not at liberty to report.

[8] Partly estimated.

Value of abrasive materials imported for consumption in the United States, 1917–1926

Material	1917	1918	1919	1920	1921
Millstones and burrstones	$18,227	$20,017	$26,356	$20,954	$13,556
Grindstones	57,950	27,361	50,551	77,046	81,880
Hones, oilstones, and whetstones	10,636	6,075	12,199	56,416	35,761
Emery and corundum	210,602	614,167	595,203	617,187	393,454
Diatomaceous earth, tripoli, and rottenstone	17,864	11,128	12,545	16,323	13,203
Pumice	147,278	33,014	119,781	249,995	173,201
Diamond dust and bort	349,746	475,870	1,420,442	3,387,488	466,345
Flint, flints, and flintstones, unground	197,156	127,808	250,096	338,630	116,157

Value of abrasive materials imported for consumption in the United States, 1917–1926—Continued

Material	1922	1923	1924	1925	1926
Millstones and burrstones	$15, 356	$20, 102	$6, 311	$8, 413	$6, 266
Grindstones	81, 733	106, 028	122, 440	124, 319	120, 335
Hones, oilstones, and whetstones	48, 938	53, 233	43, 579	49, 108	63, 152
Emery and corundum	389, 390	722, 688	364, 755	313, 718	616, 700
Garnet	[1] 1, 837	93, 803	54, 402	200	----------
Diatomaceous earth, tripoli, and rottenstone	10, 429	11, 779	9, 504	6, 589	14, 544
Pumice	118, 458	128, 693	111, 284	130, 460	129, 449
Diamond dust and bort	1, 029, 261	228, 409	259, 482	760, 476	271, 382
Flint, flints, and flintstones, unground	145, 805	130, 974	114, 958	105, 041	120, 078

[1] Not separately classified prior to change in tariff, Sept. 22, 1922.

Value of domestic abrasive materials exported, 1917–1926

Material	1917	1918	1919	1920	1921
Grindstones	$198, 772	$210, 889	$297, 068	$424, 322	$281, 976
Abrasive wheels, emery, and other	4, 481, 600	3, 862, 531	3, 032, 067	2, 791, 128	1, 318, 804
All other natural abrasives, hones, whetstones, etc	1, 941, 512	1, 982, 822	2, 809, 231	3, 810, 171	1, 719, 810

Material	1922	1923	1924	1925	1926
Grindstones	$281, 413	$499, 123	$481, 397	$553, 750	$629, 748
Abrasive wheels, emery, and other	644, 151	571, 733	521, 840	439, 904	248, 631
All other natural abrasives, hones, whetstones, etc	292, 051	342, 737	173, 731	195, 915	323, 447

ALUMINUM

[See Bauxite and aluminum]

ANTIMONY AND ANTIMONIAL LEAD

Mine production of antimony ores in the United States, 1917–1926, in short tons

Year	Ore	Antimony content	Year	Ore	Antimony content
1917	1, 060	390	1922	20	4
1918	190	50	1923	40	10
1919	----------	----------	1924	113	33
1920	----------	----------	1925	123	33
1921	----------	----------	1926	99	43

Smelter production of metallic antimony in the United States, 1917–1926 [1]

Year	From domestic ores		From foreign ores		Total	
	Short tons	Value	Short tons	Value	Short tons	Value
1917	258	$106, 812	2, 182	$903, 348	2, 440	$1, 010, 160
1918	127	32, 004	2, 490	627, 480	2, 617	659, 484
1919	----------	----------	(2)	(2)	(2)	(2)
1920	----------	----------	(2)	(2)	(2)	(2)
1925	----------	----------	(2)	(2)	(2)	(2)
1926	(2)	(2)	(2)	(2)	(2)	(2)

[1] No production reported 1921 to 1924.

[2] Only two smelters reported production in 1919 and 1926, one in 1920, and one in 1925, and the Bureau of Mines is not at liberty to publish the figures.

Secondary antimony and antimony content of secondary alloys recovered from old alloys, scrap, and dross in the United States, 1917–1926

Year	Short tons	Value [1]	Year	Short tons	Value [1]
1917	4,931	$2,061,700	1922	7,090	$765,700
1918	5,226	1,317,000	1923	8,021	1,252,800
1919	4,399	717,900	1924	9,404	2,025,600
1920	5,600	938,560	1925	10,840	3,794,000
1921	4,720	464,400	1926	16,230	5,164,400

[1] Values calculated at average yearly price for ordinary brands of antimony as published by the American Metal Market.

By-product antimonial lead produced in the United States from both foreign and domestic ores, 1917–1926

Year	Short tons	Value	Antimony content (short tons)	Year	Short tons	Value	Antimony content (short tons)
1917	18,646	$3,781,560	2,759	1922	8,075	$844,993	1,441
1918	18,570	2,826,350	2,566	1923	14,190	1,950,370	2,170
1919	13,874	1,513,968	1,943	1924	20,787	3,376,713	2,763
1920	12,535	1,963,255	2,033	1925	19,667	3,785,547	2,624
1921	10,064	870,059	1,589	1926	22,524	3,916,714	2,693

Antimony imported for consumption in the United States, 1917–1926

Year	Antimony ore [1]			Liquated antimony sulphide [2]		Metallic antimony [3]		Antimony oxides and other compounds [4]	
	Short tons	Antimony content		Short tons	Value	Short tons	Value	Short tons	Value
		Short tons	Value						
1917	10,083	5,832	$1,006,884	796	$128,660	11,286	$2,829,159	10	$5,368
1918	3,363	1,425	177,731	833	113,258	14,011	3,065,619	18	11,904
1919	993	409	54,477	278	19,202	7,159	1,021,587	126	9,501
1920	1,709	682	70,285	1,375	123,902	9,817	1,216,376	298	25,260
1921	213	98	11,682	353	17,577	10,130	784,146	154	15,558
1922				689	40,108	9,344	659,242	379	65,538
1923	(5)	1,047	44,721	835	64,493	6,763	641,804	2,277	288,206
1924	(5)	899	62,999	558	52,393	6,778	840,434	1,207	190,252
1925	1,359	773	47,084	760	115,990	9,857	2,362,915	1,792	349,990
1926	2,497	1,559	287,258	2,040	343,705	11,506	3,144,330	2,259	517,584

[1] Classified in tariff classification as "Antimony ore and stibnite containing antimony."
[2] Classified in tariff classification as "Antimony matte, containing not more than 10 per cent of lead;" also as "needle or liquated antimony."
[3] Classified in tariff classification as "Antimony regulus or metal."
[4] Classified in tariff classification as "Antimony, oxide, salts, and compounds of."
[5] Figures not available.

Foreign antimony (matte, regulus, or metal) exported from the United States, 1917–1926

Year	Pounds	Value	Year	Pounds	Value
1917	989,477	$169,260	1922 [2]	37,218	$1,548
1918	1,410,970	164,666	1923	15,958	1,047
1919 [1]	429,059	33,913	1924	279,920	14,441
1920	896,034	51,607	1925	188,976	17,376
1921	299,776	15,741	1926	367,942	41,554

[1] Also 3 short tons of antimony ore, containing 5,380 pounds of antimony, valued at $1,665, was exported in 1919.

[2] During 1922 domestic exports of "matte, regulus, or metal" were 224,610 pounds, valued at $13,961 This is the first export of domestic antimony of which there is any record. However, foreign antimony manufactured in the United States and exported would be classed as domestic exports. Similar exports for 1923 to 1926 are not shown.

ARSENIC

White arsenic (refined and crude) sold by producers in the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	6,151	$1,118,313	1922	10,027	$1,475,229
1918	[1] 6,323	1,213,000	1923	14,271	2,808,801
1919	[1] 6,029	1,181,684	1924	14,453	2,655,015
1920	11,502	2,021,356	1925	12,317	1,199,247
1921	4,786	717,700	1926	11,805	674,350

[1] In addition to the arsenious oxide (or white arsenic) elemental arsenic was produced from ore in 1918 and 1919. The totals shown include this elemental arsenic.

Arsenic compounds imported for consumption in the United States, 1917–1926

Year	Arsenic or arsenious acid (white arsenic, As_2O_3)		Arsenic sulphide (realgar and orpiment)		Sheep dip		Paris green and London purple	
	Short tons	Value	Short tons	Value	Pounds	Value	Pounds	Value
1917	1,178	$264,534	2,777	$410,341	(1)	$15,848	48	$189
1918	1,847	441,212	4,842	840,600	(1)	23,538	----------	----------
1919	4,389	624,494	2,151	316,687	146,803	12,346	18	14
1920	3,740	532,635	4,080	684,016	70,168	5,150	772	277
1921	1,669	253,250	3,343	531,322	61,377	6,362	325	123
1922 [2]	1,081	162,494	3,815	472,044	70,390	4,877	3,866	741
1923 [3]	10,152	1,985,400	1,097	268,311	87,739	5,237	100,781	20,586
1924 [4]	8,877	1,597,433	234	45,246	114,801	10,764	76,241	15,683
1925 [5]	9,316	1,076,073	476	63,296	73,477	4,953	2,880	702
1926 [6]	7,703	510,227	283	40,718	119,947	14,070	4,747	1,011

[1] Figures not available.

[2] Also 41,296 pounds of "acid," valued at $4,195, and 22,487 pounds of "metallic arsenic," valued at $3,484, imported Sept. 22 to Dec. 31, 1922. Not separately classified prior to change in tariff.

[3] Also 166,354 pounds of "acid," valued at $15,597; 174,415 pounds of "metallic arsenic," $37,314; and 26 pounds of "lead arsenate," $9.

[4] Also 420 pounds of "acid," valued at $121; 122,467 pounds of "metallic arsenic," $23,684; 3,585 pounds of "lead arsenate," $525; and 3,172 pounds of "calcium arsenate," $278.

[5] Also 59,112 pounds of "acid," valued at $2,676; 149,018 pounds of "metallic arsenic," $31,918; 10,467 pounds of "lead arsenate," $1,514; and 1,074 pounds of "calcium arsenate," $135.

[6] Also 2,340 pounds of "acid," valued at $165; 174,490 pounds of "metallic arsenic," $35,745; and 1,057 pounds of "calcium arsenate," $284.

Foreign arsenic and sulphide of, or orpiment, exported from the United States, 1917–1926 [1]

Year	Pounds	Value	Year	Pounds	Value
1917	113,600	$15,840	1920	13,799	$1,827
1918	80,050	12,017	1921	23,765	2,835
1919	----------	----------	1922	14,290	1,555

[1] Domestic exports not separately recorded. Foreign exports not separately recorded after 1922.

ASBESTOS

Asbestos sold by producers in the United States, 1917–1926, by varieties

Year	Chrysotile		Amphibole		Total	
	Short tons	Value	Short tons	Value	Short tons	Value
1917	1,391	$279,270	567	$11,744	1,958	$291,014
1918	392	101,059	606	17,628	998	118,687
1919	502	229,265	659	19,000	1,161	248,265
1920	1,245	661,907	403	16,324	1,648	678,231
1921	438	313,268	393	23,700	831	336,968
1922	25	3,320	42	6,800	67	10,120
1923	69	4,433	158	5,193	227	9,626
1924	173	33,941	127	8,585	300	42,526
1925	93	40,750	1,165	10,950	1,258	51,700
1926	[1]	[1]	[1]	[1]	1,358	134,731

[1] Bureau of Mines not at liberty to publish figures.

Asbestos (unmanufactured) imported into and exported from the United States, 1917–1926

Year	Imports for consumption		Exports	
	Short tons	Value	Short tons	Value
1917	134,088	$4,521,172	708	$116,580
1918	137,700	6,337,608	697	51,053
1919	135,270	7,369,685	1,119	157,416
1920	167,558	9,120,253	615	141,071
1921	72,463	2,948,302	520	101,600
1922	149,427	5,144,700	376	49,939
1923	212,420	7,445,143	680	48,525
1924	183,250	5,602,945	1,270	93,163
1925	230,520	7,134,302	1,109	70,846
1926	257,621	8,142,505	1,104	85,922

ASPHALT AND RELATED BITUMENS

Native asphalt and related bitumens sold at mines in the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	81,604	$773,424	1922	327,792	$2,253,180
1918	60,034	780,808	1923	400,236	2,885,631
1919	88,281	682,989	1924	562,367	3,958,339
1920	198,497	1,213,908	1925	584,850	4,148,400
1921	296,412	1,985,583	1926	715,180	4,484,960

Asphalt, manufactured in the United States from petroleum, sold at refineries in 1917–1926

Year	From domestic petroleum		From foreign petroleum	
	Short tons	Value	Short tons	Value
1917	701,809	$7,734,691	645,613	$7,441,813
1918	604,723	8,796,541	597,697	9,417,818
1919	614,692	8,727,372	674,876	7,711,510
1920	700,496	11,985,457	1,045,779	14,272,862
1921	624,220	9,048,221	908,093	11,761,358
1922	805,145	10,385,925	1,242,163	13,899,407
1923	995,654	13,060,174	1,378,722	16,840,045
1924	1,158,456	14,305,007	1,920,915	21,710,793
1925	1,206,700	15,305,760	1,971,670	27,520,010
1926	1,245,160	15,452,940	2,213,310	31,098,460

Asphalt and related bitumens imported for consumption in the United States, 1917–1926

Year	Crude asphalt		Ozokerite	
	Short tons	Value	Short tons	Value
1917	187, 473	$978, 087	450	$90, 510
1918	114, 686	624, 967	905	147, 805
1919	104, 913	609, 923	1, 874	454, 840
1920	127, 027	1, 055, 951	2, 136	499, 758
1921	116, 450	972, 166	4, 274	546, 054
1922	120, 359	940, 873	4, 495	371, 161
1923	138, 430	1, 046, 603	2, 428	213, 407
1924	156, 662	1, 165, 253	1, 557	207, 833
1925	113, 384	823, 165	3, 088	361, 767
1926	140, 746	1, 025, 629	4, 144	479, 957

Year	Ichthyol		Bituminous limestone		Total	
	Pounds	Value	Short tons	Value	Short tons	Value
1917	58, 397	$36, 232	413	$15, 028	188, 365	$1, 119, 857
1918	65, 752	39, 452	39	2, 528	115, 663	814, 752
1919	30, 976	38, 975	735	5, 576	107, 537	1, 109, 314
1920	98, 135	79, 133	1, 387	11, 665	130, 599	1, 646, 507
1921	76, 020	107, 752	12, 085	157, 124	132, 847	1, 783, 096
1922	74, 330	89, 150	4, 300	59, 590	129, 191	1, 460, 774
1923	[1] 20	15	6, 205	33, 303	147, 063	1, 293, 328
1924	9, 300	17, 058	3, 354	37, 906	161, 578	1, 428, 050
1925	560	1, 281	8, 778	84, 259	125, 250	1, 270, 472
1926	25, 396	34, 385	1, 886	19, 967	146, 789	1, 559, 938

[1] As recorded by Bureau of Foreign and Domestic Commerce. Reclassification after change in tariff, Sept. 22, 1922, may account to some extent for great decrease.

Native asphalt and related bitumens exported from the United States, 1917–1926

Year	Unmanufactured		Manufactures of (value)	Total value
	Short tons	Value		
1917	30, 107	$587, 256	$585, 472	$1, 172, 728
1918	22, 108	577, 654	577, 936	1, 155, 590
1919	40, 208	1, 103, 930	606, 918	1, 710, 848
1920	51, 706	1, 356, 116	842, 074	2, 198, 190
1921	45, 367	1, 178, 038	621, 224	1, 799, 262
1922	57, 362	1, 344, 440	[1] 1, 261, 125	2, 605, 565
1923	72, 628	1, 500, 869	[1] 2, 075, 628	3, 576, 497
1924	52, 568	1, 245, 670	[1] 2, 212, 260	3, 457, 930
1925	32, 835	825, 654	[1] 2, 525, 618	3, 351, 272
1926	38, 218	905, 743	[1] 2, 189, 808	3, 095, 551

[1] Includes value of squares (10 by 10 feet) of roofing asphalt as follows: 1922, 588,636 squares, $870,200; 1923, 783,028 squares, $1,124,491; 1924, 697,293 squares, $998,469; 1925, 661,662 squares, $919,977; 1926, 938,176 squares, $1,212,409. Corresponding exports not separately shown prior to 1922.

Exports of petroleum asphalt were not separately recorded until 1925 when 89,014 short tons, valued at $1,762,048, was exported. Similar exports in 1926 were 146,589 tons, valued at $3,183,746.

BARITE AND BARIUM PRODUCTS

BARITE

Crude barite sold or used by producers in the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	206,888	$1,171,184	1922	155,040	$1,123,950
1918	155,368	1,044,905	1923	214,183	1,664,156
1919	209,330	1,727,822	1924	196,332	1,540,744
1920	228,113	2,142,464	1925	228,063	1,703,097
1921	66,369	531,958	1926	237,875	1,773,293

Crude barite sold or used by producers in the United States, 1925–26, by States

State	1925		1926	
	Short tons	Value	Short tons	Value
Georgia	65,936	$475,618	77,654	$532,706
Missouri	101,056	794,927	118,919	946,595
Tennessee	47,012	345,038	20,910	155,780
Other States [1]	14,059	87,514	20,392	138,212
	228,063	1,703,097	237,875	1,773,293

[1] 1925: Arizona, Nevada, North Carolina, South Carolina, Virginia, and Wisconsin; 1926: Arizona, California, Illinois, Kentucky, Nevada, South Carolina, Virginia, and Wisconsin.

Crude domestic and foreign barite used in the manufacture of barium products in the United States, 1917–1926, in short tons

Year	In manufacture of—		
	Ground barite	Lithopone	Barium chemicals
1917	60,132	86,065	49,842
1918	62,440	85,282	38,041
1919	64,922	103,688	32,976
1920	79,052	113,181	37,210
1921	28,296	61,359	10,952
1922	48,280	94,259	25,303
1923	47,713	128,547	34,327
1924	42,855	137,127	33,181
1925	56,851	146,693	29,141
1926	69,048	178,889	33,119

Crude barite imported for consumption in the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	6	$63	1922	23,239	$104,680
1918	----------	----------	1923	15,045	93,721
1919	118	594	1924	21,502	104,264
1920	24,874	146,858	1925	28,655	91,016
1921	11,054	59,371	1926	51,016	195,004

Exports of barite are not separately reported.

BARIUM PRODUCTS

Barium products, manufactured in the United States from either domestic or imported crude ore, sold in 1917–1926, in short tons [1]

Product	1917	1918	1919 [2]	1920	1921
Ground barite	52, 694	55, 086	57, 985	65, 748	27, 661
Lithopone	63, 713	62, 403	79, 643	89, 373	55, 016
Barium chemicals:					
Binoxide	(3)	(3)	(3)	(3)	----------
Carbonate	8, 238	7, 661	7, 135	7, 484	1, 956
Chloride	4, 870	4, 530	4, 509	3, 084	(3)
Nitrate	165	(3)	(3)	(3)	----------
Sulphate (blanc fixe)	6, 314	9, 522	5, 227	8, 046	2, 471
Other [4]	2, 916	1, 473	3, 142	2, 146	1, 060
	138, 910	140, 675	157, 641	175, 881	88, 164

Product	1922	1923	1924	1925	1926
Ground barite	46, 176	39, 605	38, 296	49, 674	57, 812
Lithopone	83, 360	98, 199	109, 469	145, 019	159, 931
Barium chemicals:					
Carbonate	2, 281	6, 362	6, 058	4, 962	5, 394
Chloride	2, 022	3, 301	3, 859	(3)	4, 592
Sulphate (blanc fixe)	7, 349	6, 761	7, 796	11, 748	(3)
Other [4]	2, 249	379	441	1, 944	11, 925
	143, 437	154, 607	165, 919	213, 347	239, 654

[1] In order to avoid duplication of figures, barium chemicals manufactured from other barium chemicals bought in open market are not included in table.

[2] Figures for 1919 represent production.

[3] Included under "Other."

[4] 1917: Binoxide, hydroxide, and sulphide; 1918 and 1920: Binoxide, hydroxide, nitrate, and sulphide; 1919: Binoxide, nitrate, and sulphide; 1921 and 1925: Chloride, hydroxide, and sulphide; 1922: Binoxide, hydroxide, sulphide, and sulphydrate; 1923 and 1924: Hydroxide and sulphide; 1926: Hydroxide, sulphate, and sulphide.

Barium products imported for consumption in the United States, 1917–1926

Product	1917	1918	1919	1920	1921
Manufactured barite	$1, 743	----------	----------	$3, 017	$16, 942
Lithopone	29, 199	----------	$122, 708	263, 240	432, 019
Barium carbonate:					
Natural (ground witherite)	17, 321	$14, 134	4, 739	61, 284	25, 188
Manufactured (chemically precipitated)	1, 554	----------	2, 666	37, 462	80, 603
Barium binoxide				64, 447	127, 631
Barium chloride	----------	----------	19, 846	151, 778	72, 621
Blanc fixe, or barium sulphate (chemically precipitated)	3, 333	----------	90	8, 485	22, 470
	53, 150	14, 134	150, 049	589, 713	777, 474

Product	1922	1923	1924	1925	1926	
					Short tons	Value
Manufactured barite	$59, 453	$88, 741	$38, 292	$40, 008	3, 347	$44, 781
Lithopone	885, 671	776, 383	543, 025	478, 395	8, 686	661, 700
Barium carbonate:						
Natural (ground witherite)	39, 114	41, 823	56, 415	63, 634	3, 380	80, 679
Manufactured (chemically precipitated)	210, 250	79, 482	128, 217	160, 164	9, 224	189, 167
Barium binoxide	189, 334	152, 270	120, 374	70, 553	49	8, 157
Barium chloride	112, 785	75, 014	100, 810	67, 306	1, 773	49, 426
Blanc fixe, or barium sulphate (chemically precipitated)	76, 445	32, 063	50, 465	81, 439	2, 973	136, 697
Barium hydroxide	[1] 6, 573	16, 872	8, 241	5, 605	236	9, 789
Barium nitrate	[1] 16, 795	59, 766	54, 638	58, 192	602	49, 494
	1, 596, 420	1, 322, 414	1, 100, 477	1, 025, 296	30, 270	1, 229, 890

[1] Not separately classified prior to change in tariff Sept. 22, 1922.

Prior to 1922 barium products had not been exported in appreciable quantity, and no separate record of the exports was kept. Exports of lithopone have been as follows: 1922, 1,616 short tons, valued at $169,982; 1923, 1,485 tons, $176,624; 1924, 923 tons, $104,783; 1925, 1,287 tons, $132,771; 1926, 1,941 tons, $200,412.

BAUXITE AND ALUMINUM

BAUXITE

Bauxite produced in the United States, 1917–1926

Year	Georgia, Alabama, and Tennessee		Arkansas		Total	
	Long tons	Value	Long tons	Value	Long tons	Value
1917	62,134	$395,051	506,556	$2,724,007	568,690	$3,119,058
1918	42,829	314,112	562,892	3,133,880	605,721	3,447,992
1919	43,076	346,588	333,490	1,855,159	376,566	2,201,747
1920	40,029	349,453	481,279	2,897,892	521,308	3,247,345
1921	14,700	134,400	124,850	755,400	139,550	889,800
1922	42,810	329,440	266,790	1,682,890	309,600	2,012,330
1923	28,810	176,030	493,880	2,980,580	522,690	3,156,610
1924	19,940	156,990	327,630	1,981,000	347,570	2,137,990
1925	20,220	109,800	296,320	1,878,450	316,540	1,988,250
1926	20,680	116,650	371,570	2,298,550	392,250	2,415,200

Bauxite imported into and exported from the United States, 1917–1926

Year	Imports for consumption		Exports (including bauxite concentrates)	
	Long tons	Value	Long tons	Value
1917	7,691	$28,989	21,791	$1,323,926
1918	3,653	14,791	19,711	1,523,688
1919	6,082	36,820	17,701	1,372,094
1920	42,895	251,284	22,257	1,843,596
1921	27,587	164,589	5,942	488,785
1922	23,656	93,805	19,617	961,208
1923	119,020	593,882	78,560	3,380,486
1924	201,974	909,493	77,065	3,979,832
1925	353,696	1,549,120	78,633	4,134,455
1926	281,644	1,187,497	87,770	4,741,260

ALUMINUM

Value of aluminum produced in the United States, 1917–1926

Year	Primary metal	Secondary metal [1]
1917	$45,882,000	$16,711,800
1918	41,159,000	10,113,600
1919	38,558,000	12,014,600
1920	41,375,000	9,489,100
1921	10,906,000	3,775,400
1922	$13,622,000	$6,085,900
1923	28,305,000	10,824,600
1924	37,607,000	14,596,200
1925	36,430,000	24,816,000
1926	37,583,000	23,868,000

[1] Value of secondary aluminum based on average price at New York, as given by American Metal Market.

Aluminum imported for consumption in the United States, 1917–1926

Year	Crude and semicrude [1]		Manufactures of [2]	Total value
	Pounds	Value		
1917	89, 291	$35, 386	$21, 504	$56, 890
1918	1, 690, 683	533, 704	20, 882	554, 586
1919	13, 852, 065	4, 530, 579	38, 016	4, 568, 595
1920	39, 298, 649	12, 183, 891	893, 131	13, 077, 022
1921	32, 559, 017	7, 627, 508	1, 262, 283	8, 889, 791
1922	43, 891, 933	8, 286, 819	1, 408, 193	9, 695, 012
1923	42, 476, 789	8, 316, 816	425, 747	8, 742, 563
1924	31, 809, 941	6, 859, 785	285, 251	7, 145, 036
1925	41, 997, 178	9, 805, 645	301, 122	10, 106, 767
1926	71, 391, 717	16, 421, 905	357, 472	16, 779, 377

[1] Includes crude aluminum, plates, sheets, wire, etc.
[2] Includes aluminum leaf, kitchen utensils, and all other manufactures of aluminum.

Aluminum and manufactures of aluminum exported from the United States, 1917–1926

Year	Crude and semicrude [1]		Manufactures of	Total value
	Pounds	Value		
1917 January to June	(2)	(2)	(2)	$9, 029, 458
1917 July to December	10, 020, 404	$4, 571, 193	$985, 816	5, 557, 009
1918	24, 135, 234	8, 979, 315	1, 890, 073	10, 869, 388
1919	5, 020, 352	1, 744, 896	2, 145, 430	3, 890, 326
1920	9, 407, 631	3, 067, 617	2, 563, 164	5, 630, 781
1921	2, 196, 378	801, 075	2, 307, 782	3, 108, 857
1922	4, 347, 020	1, 127, 460	[3] 1, 708, 656	2, 836, 116
1923	5, 539, 671	1, 517, 562	[3] 2, 053, 977	3, 571, 539
1924	6, 343, 512	1, 632, 315	[3] 2, 540, 075	4, 172, 390
1925	12, 642, 034	3, 365, 815	[3] 2, 691, 256	6, 057, 071
1926	7, 634, 171	2, 135, 087	[4] 2, 317, 216	4, 452, 303

[1] Includes ingots, metal and alloys, plates and sheets, etc.
[2] Not separately recorded prior to July, 1917.
[3] Represents value of 4,544,949 pounds in 1922, 5,402,034 pounds in 1923, 6,783,240 pounds in 1924, and 6,463,192 pounds in 1925 of tubes, moldings, castings, and other shapes, table, kitchen, or hospital utensils, and other manufactures. Figures of quantity not available prior to 1922.
[4] Tubes, moldings, castings, and other shapes exported amounted to 2,115,274 pounds; the quantity of table, kitchen, or hospital utensils, and other manufactures exported is not recorded.

BISMUTH

The bismuth produced in the United States is a by-product obtained in the refining of lead and tin bullion, part of which is from ores of foreign origin. Figures of production are not available for publication.

Bismuth imported for consumption in the United States, 1917–1926

Year	Pounds	Value	Year	Pounds	Value
1917	69, 250	$142, 300	1922 [1]	121, 505	$239, 777
1918	135, 700	277, 273	1923 [1]	62, 640	146, 178
1919	57, 607	55, 179	1924 [1]	18, 494	39, 653
1920	72, 771	161, 877	1925 [1]	99, 694	187, 340
1921	94, 085	114, 891	1926 [1]	67, 505	173, 285

[1] Also 9,392 pounds of "compounds, mixtures, and salts of bismuth," valued at $8,681, imported Sept. 22 to Dec. 31, 1922. Not separately classified prior to change in tariff. Similar additional imports in 1923 were 11,731 pounds, valued at $13,717; in 1924, 10,066 pounds, $12,533; in 1925, 16,983 pounds, $18,958; and in 1926, 12,864 pounds, $18,864.

Exports of bismuth are not separately recorded.

BORAX

[See Sodium salts (natural)]

BRIQUETS (FUEL)

Fuel briquets produced in the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	406, 856	$2, 233, 888	1922	619, 425	$5, 444, 926
1918	477, 235	3, 212, 793	1923	696, 810	5, 898, 698
1919	295, 734	2, 301, 054	1924	580, 470	4, 986, 622
1920	567, 192	4, 623, 831	1925	839, 370	7, 128, 404
1921	398, 949	3, 632, 301	1926	995, 332	8, 533, 179

Briquets and other composition coals for fuels imported for consumption in the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	(1)	$752	1922	34, 862	$139, 382
1918 January to June	(1)	280	1923	19, 559	103, 201
July to December	432	2, 797	1924	38	443
1919	136	1, 050	1925	6, 758	43, 931
1920	(2)	9	1926	123, 593	736, 804
1921	66	251			

[1] Quantity not recorded prior to July, 1918.

[2] 112 pounds.

BROMINE

Bromine and bromine in compounds sold or used by producers in the United States, 1917–1926

Year	Pounds	Value	Year	Pounds	Value
1917	895, 499	$492, 703	1922	1, 005, 174	$150, 668
1918	1, 727, 156	970, 099	1923	842, 352	146, 176
1919	1, 854, 971	1, 234, 969	1924	2, 033, 804	594, 685
1920	1, 160, 584	745, 381	1925	1, 566, 120	488, 406
1921	711, 953	172, 759	1926	1, 245, 760	426, 837

Imports of bromine have been as follows: 1926, 37,839 pounds, valued at $14,486; 1925, 8,009 pounds, $2,110; 1924, 37,318 pounds, $8,958; 1923, 782 pounds, $1,171; 1922, 1,094 pounds, $339; 1921, 300 pounds, $84. No imports were recorded for 1917 to 1920.

Exports are not specifically shown.

CADMIUM

Metallic cadmium and cadmium sulphide produced in the United States, 1917–1926

Year	Metallic cadmium		Cadmium sulphide	
	Pounds	Value	Pounds	Value
1917	207, 408	$305, 097	50, 169	$70, 939
1918	127, 164	188, 203	51, 702	70, 315
1919	99, 939	121, 926	31, 197	37, 436
1920	129, 283	151, 261	32, 133	37, 274
1921	68, 501	67, 131	65, 446	71, 336
1922	131, 590	143, 433	134, 774	152, 295
1923	183, 816	161, 758	(1)	(1)
1924	129, 328	77, 597	(1)	(1)
1925	502, 824	276, 553	(1)	(1)
1926	810, 428	429, 527	(1)	(1)

[1] Bureau of Mines not at liberty to publish figures.

Imports of cadmium for consumption have been as follows: 1926, none; 1925, 5 pounds, valued at $6; 1924, 1,102 pounds, $743; 1923, 16 pounds, $119; 1922, 2,240 pounds, $2,434; 1921, 101 pounds, $216; 1917–1920, none.

Exports of cadmium are not separately recorded by the Bureau of Foreign and Domestic Commerce, and hence are not regularly available, but it is known that domestic cadmium was largely exported during the World War. Special canvasses showed that about 40,000 pounds of cadmium was exported in 1918, of which the larger part went to France.

CALCIUM CHLORIDE

Calcium-magnesium chloride, from natural brines, sold by producers in the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	30, 503	$451, 480	1922	33, 067	$571, 326
1918	26, 624	503, 452	1923	44, 961	663, 384
1919	26, 123	321, 596	1924	58, 791	1, 164, 848
1920	27, 849	539, 471	1925	67, 870	1, 386, 639
1921	23, 672	510, 723	1926	82, 340	1, 710, 405

Imports of calcium chloride have been as follows: 1926, 7,372 short tons, valued at $96,742; 1925, 2,253 tons, $37,121; 1924, 3,996 tons, $54,542; 1923, 3,232 tons, $48,527. From September 22 to December 31, 1922, 740 tons, valued at $8,563, was imported. Similar imports were not separately recorded prior to change in tariff.

Exports of calcium chloride are not separately shown.

CARBON BLACK

Carbon black produced from natural gas in the United States, 1919–1926 [1]

Year	Number of producers reporting	Carbon black produced		Natural gas used (estimate)
		Pounds	Value at plant	M cubic feet
1919	17	52, 056, 941	$3, 816, 040	49, 896, 000
1920	19	51, 321, 892	4, 032, 286	40, 599, 000
1921	23	59, 766, 315	5, 445, 878	50, 565, 000
1922	26	67, 795, 129	5, 819, 618	53, 629, 000
1923	47	138, 262, 648	11, 692, 066	109, 096, 000
1924	46	186, 872, 034	11, 564, 936	156, 514, 000
1925	42	177, 417, 378	9, 639, 585	140, 366, 000
1926	33	180, 576, 176	9, 939, 221	130, 321, 000

[1] Figures not available prior to 1919.

Imports of carbon black are not separately recorded. Exports were not separately recorded until 1925 when they were 43,182,635 pounds, valued at $3,555,769. Similar exports in 1926 were 39,210,389 pounds, valued at $3,622,907.

CEMENT

Hydraulic cements shipped from mills in the United States, 1917–1926

Year	Masonry, natural, and puzzolan cements		Portland cement		Total	
	Barrels	Value	Barrels	Value	Barrels	Value
1917	639, 456	$435, 370	90, 703, 474	$122, 775, 088	91, 342, 930	$123, 210, 458
1918	432, 966	401, 341	70, 915, 508	113, 316, 275	71, 348, 474	113, 717, 616
1919	528, 589	583, 554	85, 612, 899	146, 734, 844	86, 141, 488	147, 318, 398
1920	767, 481	1, 150, 890	96, 311, 719	194, 439, 025	97, 079, 200	195, 589, 915
1921	539, 402	897, 025	95, 507, 147	180, 778, 415	96, 046, 549	181, 675, 440
1922	889, 428	1, 293, 598	117, 701, 216	207, 170, 430	118, 590, 644	208, 464, 028
1923	1, 271, 674	1, 947, 352	135, 912, 118	257, 684, 424	137, 183, 792	259, 631, 776
1924	1, 418, 461	2, 006, 559	146, 047, 549	264, 046, 708	147, 466, 010	266, 053, 267
1925	1, 751, 725	2, 551, 583	157, 295, 212	278, 524, 108	159, 046, 937	281, 075, 691
1926	2, 031, 851	2, 820, 110	162, 187, 090	277, 965, 473	164, 218, 941	280, 785, 583

Portland cement produced in the United States, 1917–1926, in barrels

1917	92, 814, 202	1922	114, 789, 984
1918	71, 081, 663	1923	137, 460, 238
1919	80, 777, 935	1924	149, 358, 109
1920	100, 023, 245	1925	161, 658, 901
1921	98, 842, 049	1926	164, 530, 170

Portland cement produced, shipped, and in stock in the United States, 1925-26, by States and districts

	Production				Shipments				Stock at mills (Dec. 31) (barrels)	
	Active plants		Barrels		1925		1926		1925	1926
	1925	1926	1925	1926	Barrels	Value	Barrels	Value		
STATE										
Alabama	5	5	6, 288, 117	6, 709, 829	6, 045, 967	$9, 824, 439	6, 693, 900	$10, 825, 421	387, 497	403, 426
California	10	11	13, 098, 140	13, 842, 483	13, 109, 426	26, 159, 531	13, 660, 078	25, 299, 245	484, 393	666, 798
Illinois	4	4	7, 101, 024	6, 747, 241	6, 749, 532	11, 481, 576	6, 977, 598	11, 388, 800	1, 042, 826	812, 469
Iowa	5	4	4, 648, 145	4, 925, 811	4, 856, 849	8, 674, 563	4, 788, 639	8, 167, 341	1, 479, 670	1, 616, 842
Kansas	7	7	6, 511, 393	6, 357, 581	6, 513, 297	10, 861, 506	6, 150, 694	9, 757, 699	892, 618	1, 099, 505
Michigan	16	16	10, 936, 181	12, 037, 400	10, 073, 453	17, 511, 908	11, 959, 447	19, 499, 788	1, 819, 521	1, 897, 474
Missouri	5	5	8, 331, 751	7, 653, 111	8, 168, 165	14, 155, 795	7, 639, 966	12, 917, 342	1, 084, 752	1, 097, 897
New York	9	9	8, 769, 584	8, 795, 768	8, 534, 089	14, 967, 642	8, 535, 862	14, 864, 066	1, 024, 621	1, 284, 527
Ohio	9	10	5, 714, 685	7, 556, 493	5, 426, 768	9, 600, 084	7, 422, 720	12, 831, 503	936, 594	1, 070, 367
Pennsylvania	22	23	42, 346, 830	42, 865, 694	41, 899, 787	72, 870, 981	41, 395, 604	70, 437, 218	3, 249, 649	4, 719, 739
Texas	6	6	4, 858, 212	5, 007, 374	4, 735, 521	8, 729, 046	5, 042, 359	9, 522, 701	478, 903	443, 918
Other States [1]	40	40	43, 054, 839	42, 031, 385	41, 182, 358	73, 687, 037	41, 920, 223	72, 454, 349	5, 455, 129	5, 566, 291
	138	140	161, 658, 901	164, 530, 170	157, 295, 212	278, 524, 108	162, 187, 090	277, 965, 473	18, 336, 173	20, 679, 253
COMMERCIAL DISTRICT										
Eastern Pennsylvania, New Jersey, and Maryland	22	23	40, 279, 457	42, 139, 204	40, 286, 898	70, 094, 072	40, 635, 514	69, 581, 973	2, 577, 771	4, 081, 461
New York	9	9	8, 769, 584	8, 795, 768	8, 534, 089	14, 967, 642	8, 535, 862	14, 864, 066	1, 024, 621	1, 284, 527
Ohio, western Pennsylvania, and West Virginia	14	15	15, 572, 602	15, 913, 500	14, 628, 575	25, 614, 083	15, 758, 822	26, 336, 705	2, 306, 030	2, 460, 708
Michigan	16	16	10, 936, 181	12, 037, 400	10, 073, 453	17, 511, 908	11, 959, 447	19, 499, 788	1, 819, 521	1, 897, 474
Wisconsin, Illinois, Indiana, and Kentucky	11	11	23, 521, 488	21, 350, 107	22, 052, 884	37, 792, 110	21, 876, 629	36, 267, 413	3, 510, 364	2, 983, 842
Virginia, Tennessee, Alabama, and Georgia	14	14	13, 505, 792	15, 307, 606	13, 048, 251	21, 581, 494	14, 963, 262	24, 860, 207	850, 370	1, 194, 714
Eastern Missouri, Iowa, Minnesota, and South Dakota	11	10	14, 571, 751	14, 138, 619	14, 477, 932	25, 317, 292	14, 026, 247	23, 754, 460	2, 824, 241	2, 936, 613
Western Missouri, Nebraska, Kansas, and Oklahoma	11	11	10, 672, 816	10, 277, 391	10, 524, 247	17, 772, 268	10, 158, 484	16, 068, 802	1, 658, 502	1, 777, 409
Texas	6	6	4, 858, 212	5, 007, 374	4, 735, 521	8, 729, 046	5, 042, 359	9, 522, 701	478, 903	443, 918
Colorado. Montana, and Utah	7	7	2, 299, 071	2, 523, 509	2, 263, 421	4, 978, 808	2, 457, 303	5, 167, 446	417, 613	483, 819
California	10	11	13, 098, 140	13, 842, 483	13, 109, 426	26, 159, 531	13, 660, 078	25, 299, 245	484, 393	666, 798
Oregon and Washington	7	7	3, 573, 807	3, 197, 209	3, 560, 515	8, 005, 854	3, 113, 083	6, 742, 667	383, 844	467, 970
	138	140	161, 658, 901	164, 530, 170	157, 295, 212	278, 524, 108	162, 187, 090	277, 965, 473	18, 336, 173	20, 679, 253

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[1] Includes Colorado, Georgia, Indiana, Kentucky, Maryland, Minnesota, Montana, Nebraska, New Jersey, Oklahoma, Oregon, South Dakota, Tennessee, Utah, Virginia, Washington, West Virginia, and Wisconsin.

Hydraulic cement imported into and exported from the United States, 1917–1926

Year	Imports for consumption		Exports	
	Barrels	Value	Barrels	Value
1917	2, 323	$6, 076	2, 586, 215	$5, 328, 536
1918	305	1, 200	2, 252, 446	5, 912, 166
1919	8, 931	52, 636	2, 463, 573	7, 513, 389
1920	524, 604	1, 254, 729	2, 985, 807	10, 045, 369
1921	122, 317	388, 842	1, 181, 014	4, 276, 986
1922	355, 931	692, 429	1, 127, 845	3, 206, 201
1923	1, 767, 264	3, 145, 977	1, 001, 688	2, 944, 174
1924	2, 023, 663	3, 139, 788	878, 543	2, 615, 154
1925	3, 667, 458	5, 836, 482	1, 019, 597	3, 003, 128
1926	3, 244, 223	5, 154, 926	974, 326	2, 995, 833

CHROMITE

Chromite shipped from mines in the United States, 1917–1926

Year	Long tons	Value	Year	Long tons	Value
1917	43, 725	$1, 049, 400	1922	355	$7, 288
1918	82, 430	3, 955, 567	1923	227	3, 819
1919	5, 079	129, 302	1924	288	1, 140
1920	2, 502	44, 857	1925	108	2, 105
1921	282	2, 900	1926	141	2, 079

Crude chromite imported for consumption in the United States, 1917–1926

Year	Long tons	Value	Year	Long tons	Value
1917	72, 063	$1, 110, 659	1922	90, 081	$741, 186
1918	100, 142	2, 892, 825	1923	129, 693	1, 123, 120
1919	61, 404	1, 381, 497	1924	118, 343	1, 095, 603
1920	150, 275	1, 921, 824	1925	149, 739	1, 207, 420
1921	81, 836	654, 602	1926	215, 464	1, 704, 947

There are no exports of chromite.

CLAY

Clay sold by producers in the United States, 1917–1926

Year	Kaolin or china clay and paper clay		Ball clay		Slip clay		Fire clay	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
1917	206,334	$1,263,799	107,406	$569,240	16.972	$70,505	2,347,972	$5,625,095
1918	179,694	1,459,529	89,896	590,631	13,552	49,898	2,305.033	5,664,064
1919	152,828	1,475,681	65,026	520,849	5,149	17,556	1,755,331	4,628,605
1920	268,203	2,865,407	69,477	584,611	9,006	41,519	2,261,915	7,088,049
1921	162,726	1,579,163	54,014	354,565	4,608	14,841	1,195,861	3,560,373
1922	275,675	2,346,095	76.792	440,877	4,050	19,405	1,679,220	4,633,486
1923	336,803	2,926,255	97.068	620,978	8,520	43,609	2,298,163	6,565,899
1924	326,611	2,923,965	83,034	581,966	5,910	31,023	2,443,710	6,737,063
1925	367,319	3,220.719	109,607	699,427	7,349	37,397	2,566,934	7,312,349
1926	432,215	3,771,568	112,195	867,500	8,644	45,959	2,819,346	8,119,323

Year	Stoneware clay		Miscellaneous clay		Total	
	Short tons	Value	Short tons	Value	Short tons	Value
1917	81,352	$113,839	353,808	$400,068	3,113.844	$8,042,546
1918	86.800	147,098	301,386	421,421	2,976,361	8,332,641
1919	60,236	80,367	236,530	367,573	2.275,100	7,090,631
1920	106,350	229,221	322,100	467,856	3,037,051	11,276,663
1921	86,574	184,540	242,963	361,818	1,746,746	6,055,300
1922	86,866	164,870	525,097	725,781	2,647,700	8,330,514
1923	81,389	194,358	612,717	837,814	3,434,660	11,188,913
1924	59,194	117,142	772,660	1,116.377	3,691,119	11,507,536
1925	77,438	162,161	901,773	1,304,579	4,030.420	12,736,632
1926	84,002	185,288	510,796	1,115,951	3,967,198	14,105.589

Clay imported for consumption in the United States, 1917–1926

Year	Kaolin or china clay		Common blue and Gross Almerode glass-pot clay		All other clays				Total	
					Unwrought		Wrought			
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
1917	241,029	$1,315,769	88	$709	26,581	$123,439	338	$2,142	268,036	$1,442,059
1918	168,100	1,153,240	114	983	26,984	163,484	137	1,087	195,335	1,318,794
1919	180,592	1,965,393	4	133	23,759	187,550	498	4,262	204,853	2,157,338
1920	361,800	3,568,677	6,837	157,201	34,252	272,524	691	10,267	403,580	4,008,669
1921	162,906	1,546,285	4,468	77,217	41,421	348,870	120	2,313	208,915	1,974,685
1922	310,136	2,963,420	7,323	84,415	40,624	327,388	2,566	29,398	360,649	3,404,621
1923	311,298	3,046,191	12,999	121,272	65,379	481,614	1,676	21,892	391,352	3,670,969
1924	353,124	3,188,454	7,059	62,883	82,562	706,018	1,322	18,685	444,067	3,976,040
1925	372,552	3,195,694	11,889	107,940	49,991	499,325	2,383	29,266	436,815	3,832,225
1926	396,219	3,484,054	6,608	60,391	84,512	672,223	2,331	31,243	489,670	4,247,911

Domestic clay exported from the United States, 1917–1926

Year	Fire clay		All other		Total	
	Short tons	Value	Short tons	Value	Short tons	Value
1917	54,023	$268,093	29,194	$178,764	83,217	$446,857
1918	60,206	333,880	24,348	192,053	84,554	525,933
1919	37,486	262,501	30,983	249,571	68,469	512,072
1920	54,125	393,177	66,035	775,222	120,160	1,168,399
1921	23,666	177,979	23,779	183,449	47,445	361,428
1922	24,391	169,664	[1] 23,285	[1] 267,908	47,676	437,572
1923	50,055	303,675	34,840	329,192	84,895	632,867
1924	41,704	312,676	31,051	420,040	72,755	732,716
1925	44,037	350,571	39,006	530,995	83,043	881,566
1926	47,737	348,302	42,157	644,416	89,894	992,718

[1] Includes 2,091 short tons of "kaolin, china, and paper clay," valued at $27,840. Similar exports not shown separately for other years.

CLAY PRODUCTS

Value of clay products of the United States, 1917–1926 [1]

Year	Brick and tile	Pottery	Total	Year	Brick and tile	Pottery	Total
1917	$176,350,251	$56,162,522	$232,512,773	1922	[2] $229,508,106	$91,986,297	[2] $321,494,403
1918	156,661,700	63,911,793	220,573,493	1923	309,631,561	114,951,067	424,582,628
1919	197,488,616	77,857,762	275,346,378	1924	297,764,393	118,014,985	415,779,378
1920	266,953,426	106,716,676	373,670,102	1925	311,428,417	112,018,500	423,446,917
1921	186,589,507	84,149,029	270,738,536	1926	313,935,186	116,493,308	430,428,494

[1] Canvass discontinued by U. S. Geological Survey after 1920. Figures for 1921 to 1926 obtained through cooperation with Bureau of the Census.

[2] Includes value of "prepared clay," figures for which are not separately published.

Clay products of the United States, 1925–26, by products [1]

Product	1925		1926	
	Quantity	Value	Quantity	Value
Common brick thousands	7,561,501	$88,551,400	7,517,211	$88,226,625
Vitrified brick or block do	539,101	11,875,697	467,580	10,284,741
Face brick do	2,474,690	45,427,625	2,439,820	44,516,236
Fancy or ornamental brick do	1,701	50,279	115	3,592
Enameled brick do	16,931	1,507,659	15,441	1,275,692
Architectural terra cotta short tons	152,441	19,138,690	155,564	19,666,880
Fireproofing and hollow building tile do	4,224,902	29,264,224	4,096,417	27,818,428
Flue lining do	182,267	2,480,327	241,465	2,857,309
Tile (not drain)		27,123,809		34,985,194
Draintile short tons	660,673	4,960,423	519,483	3,858,408
Sewer pipe do	2,138,672	30,420,828	1,994,333	29,303,094
Stove lining do	25,852	656,139	11,573	472,904
Fire brick thousands	995,079	41,163,701	1,078,788	42,706,932
Wall coping short tons	37,124	381,367	56,345	685,303
Miscellaneous		8,426,249		7,273,848
Total brick and tile		311,428,417		313,935,186
Total pottery		112,018,500		116,493,308
Grand total		423,446,917		430,428,494

[1] Figures obtained through cooperation with Bureau of the Census.

Value of clay products of the United States, 1925–26, by States[1]

State	1925				1926			
	Number of firms reporting	Brick and tile	Pottery	Total	Number of firms reporting	Brick and tile	Pottery	Total
Alabama	44	$4,980,321	$7,575	$4,987,896	40	$5,170,696	$10,875	$5,181,571
Arizona	10	181,358	------------	181,358	8	197,037	------------	197,037
Arkansas	14	1,689,611	(2)	[3] 1,689,611	17	1,544,771	(2)	[3] 1,544,771
California	99	18,511,530	2,813,314	21,324,844	105	17,425,771	3,143,721	20,569,492
Colorado	36	3,839,323	287,622	4,126,945	35	3,071,423	310,353	3,381,776
Connecticut	29	2,509,727	(2)	[3] 2,509,727	27	3,291,298	(2)	[3] 3,291,298
Delaware	9	271,701	------------	271,701	6	156,897	------------	156,897
District of Columbia	4	131,080	(2)	[3] 131,080	4	(2)	(2)	208,683
Florida	10	317,339	(2)	[3] 317,339	10	(2)	(2)	465,960
Georgia	38	6,362,365	6,862	6,369,227	35	5,957,486	(2)	[3] 5,957,486
Idaho	5	184,007	------------	184,007	4	(2)	------------	(2)
Illinois	136	31,340,980	5,423,000	36,763,980	142	31,417.593	5,612,411	37,030,004
Indiana	112	14,344,546	3,693,386	18,037,932	94	14,869,015	3,878,820	18,747,835
Iowa	65	5,703,537	(2)	[3] 5,703,537	51	4,459,724	(2)	[3] 4,459,724
Kansas	32	4,345,971	(2)	[3] 4,345,971	29	(2)	(2)	3,969,040
Kentucky	50	7,647,922	205,433	7,853,355	49	7,428,678	248,180	7,676,858
Louisiana	20	674,167	(2)	[3] 674,167	16	(2)	(2)	682,307
Maine	16	625,969	------------	625,969	19	(2)	------------	(2)
Maryland	32	2,868,452	(2)	[3] 2,868,452	30	2,893,860	3,179,387	6,073,247
Massachusetts	39	2,613,560	1,175,604	3,789,164	42	2,675,526	1,296,060	3,971,586
Michigan	43	4,287,422	3,108,649	7,396,071	42	4,227,731	3,134,276	7,362,007
Minnesota	27	1,764,860	(2)	[3] 1,764,860	27	1,852,566	(2)	[3] 1,852,566
Mississippi	28	1,026.141	24.100	1,050,241	23	1,006,661	(2)	[3] 1,006,661
Missouri	68	17,521,866	(2)	[3] 17,521,866	66	17,562,247	56,684	17,618,931
Montana	10	271,187	------------	271,187	11	273,121	------------	273,121
Nebraska	26	964,258	(2)	[3] 964,258	24	1,112,923	(2)	[3] 1,112,923
Nevada	1	(2)	------------	(2)	1	(2)	------------	(2)
New Hampshire	12	828,541	------------	828,541	12	881,997	------------	881,997
New Jersey	127	21,610,853	24,399,771	46,010,624	126	23,046,186	24,466,328	47,512,514
New Mexico	5	144,639	------------	144,639	4	(2)	------------	(2)
New York	121	17,174,844	7,375,907	24,550,751	124	21,494,016	7,505,037	28,999,053
North Carolina	72	3,860,702	8,260	3,868,962	77	4,225,653	31,248	4,256,901
North Dakota	4	149,774	------------	149,774	4	(2)	------------	(2)
Ohio	393	57,602,803	40,389,018	97,991,821	380	56,855,563	41,017,539	97,873,102
Oklahoma	18	1,813,425	------------	1,813,425	20	1,504,744	------------	1,504,744
Oregon	20	839,286	(2)	[3] 839,286	20	(2)	(2)	(2)
Pennsylvania	313	46,424,975	7,944,427	54,369,402	309	46,558,926	8,482,344	55,041,270
Rhode Island	1	(2)	------------	(2)	1	(2)	------------	(2)
South Carolina	26	1,881,936	24,305	1,906,241	26	1,869,420	(2)	[3] 1,869,420
South Dakota	2	(2)	------------	(2)	1	(2)	------------	(2)
Tennessee	40	3,941,395	(2)	[3] 3,941,395	43	4,201,783	904,044	5,105,827
Texas	67	6,139,614	158,431	6,298,045	70	5,814,913	196,068	6,010,981
Utah	14	1,017,752	(2)	[3] 1,017,752	13	929,782	(2)	[3] 929,782
Vermont	3	98,564	------------	98,564	3	(2)	------------	(2)
Virginia	51	3.909,634	(2)	[3] 3,909,634	50	3,755,980	(2)	[3] 3,755,980
Washington	33	2,597,207	22,043	2,619,250	34	2,557,967	25,366	2,583,333
West Virginia	50	4,721,645	10,571,726	15,293,371	51	5,182,626	10,938,546	16,121,172
Wisconsin	37	1,180,496	(2)	[3] 1,180,496	34	(2)	(2)	(2)
Wyoming	5	99,771	------------	99,771	3	(2)	------------	(2)
Undistributed	------	411,361	4,379,067	4,790,428	------	8,460,606	2,056,021	5,190,637
	2,417	311,428,417	112,018,500	423,446,917	2,362	313,935,186	116,493,308	430,428,494

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[1] Figures obtained through cooperation with Bureau of the Census.

[2] Included under "Undistributed."

[3] Exclusive of pottery, value for which is included under "Undistributed."

Value of clay products imported for consumption in the United States, 1917–1926

Year	Pottery								Brick, fire brick, tile, and miscellaneous clay products	Grand total
	Brown earthen and common stone ware [1]	Tobacco pipes and pipe bowls of clay	Earthenware and crockery composed of a nonvitrified absorbent body		China and porcelain		Sanitary earthenware, decorated and not decorated	Total		
			Not decorated	Decorated	Not decorated	Decorated				
1917	$518, 965	$8, 209	$235, 104	$1, 960, 150	$157, 658	$3, 409, 527	$43, 701	$6, 333, 314	$309, 259	$6, 642, 573
1918	436, 207	4, 716	317, 501	2, 147, 486	200, 328	3, 269, 008	18, 334	6, 393, 580	290, 620	6, 684, 200
1919	293, 120	15, 852	350, 644	2, 476, 210	359, 560	3, 726, 695	7, 980	7, 230, 061	196, 839	7, 426, 900
1920	390, 962	12, 091	340, 676	3, 805, 955	431, 636	5, 856, 384	13, 068	10, 850, 772	252, 656	11, 103, 428
1921	288, 893	11, 535	405, 370	3, 871, 554	646, 427	6, 918, 179	12, 067	12, 154, 025	228, 804	12, 382, 829
1922	341, 997	15, 638	339, 066	4, 427, 001	641, 261	6, 298, 440	17, 295	12, 080, 698	375, 764	12, 456, 462
1923	263, 388	26, 606	881, 480	4, 916, 906	864, 239	8, 830, 266	346, 589	16, 129, 474	864, 124	16, 993, 598
1924	314, 721	14, 517	765, 070	5, 041, 570	799, 772	9, 504, 905	125, 100	16, 565, 655	690, 639	17, 256, 294
1925	401, 421	22, 385	544, 124	5, 679, 094	699, 792	9, 994, 062	5, 463	17, 346, 341	935, 507	18, 281, 848
1926	359, 951	21, 661	445, 436	6, 444, 433	623, 360	11, 383, 666	1, 873	19, 280, 380	1,939,843	21, 220, 223

[1] Including Rockingham ware and miscellaneous pottery products.

Value of clay products of domestic manufacture exported from the United States, 1917–1926

Year	Building brick	Fire brick	Tile (except drain)	Earthen and stone ware	China	Sanitary earthenware	All other	Total
1917	$196, 207	$4, 011, 546	$450, 422	$805, 784	$422, 641	$323, 558	$743, 105	$6, 953, 263
1918	117, 263	5, 001, 057	582, 051	783, 577	318, 448	377, 527	752, 651	7, 932, 574
1919	248, 690	2, 747, 512	628, 836	1, 148, 051	523, 861	563, 734	721, 600	6, 582, 284
1920	382, 814	4, 200, 266	1, 025, 083	1, 241, 938	816, 817	778, 714	951, 991	9, 397, 623
1921	415, 402	2, 314, 911	814, 456	1, 014, 329	312, 161	535, 506	873, 182	6, 279, 947
1922	210, 215	1, 581, 679	390, 408	981, 082	316, 973	561, 536	[1] 1, 599, 949	5, 641, 842
1923	282, 454	2, 332, 536	373, 866	932, 779	334, 146	657, 859	[1] 1, 915, 842	6, 829, 482
1924	222, 033	1, 463, 412	400, 452	753, 652	259, 098	745, 746	[1] 1, 863, 324	5, 707, 717
1925	194, 153	1, 323, 128	396, 088	758, 883	255, 578	788, 528	[1] 1, 041, 484	4, 757, 842
1926	176, 711	1, 406, 809	376, 162	694, 736	268, 796	1, 026, 636	[1] 1, 691, 131	5, 640, 981

[1] Includes electric porcelain valued at $1,379,750 in 1922, $1,783,614 in 1923, $1,767,323 in 1924, $949,785 in 1925, and $1,541,675 in 1926; not separately classified prior to 1922.

COAL

Coal produced in the United States, 1917–1926

Year	Pennsylvania anthracite		Bituminous		Total	
	Short tons	Value	Short tons	Value	Short tons	Value
1917	99, 611, 811	$283, 650, 723	551, 790, 563	$1, 249, 272, 837	651, 402, 374	$1, 532, 923, 560
1918	98, 826, 084	336, 480, 347	579, 385, 820	1, 491, 809, 940	678, 211, 904	1, 828, 290, 287
1919	88, 092, 201	364, 926, 950	465, 860, 058	1, 160, 616, 013	553, 952, 259	1, 525, 542, 963
1920	89, 598, 249	434, 252, 198	568, 666, 683	2, 129, 933, 000	658, 264, 932	2, 564, 185, 000
1921	90, 473, 451	452, 304, 903	415, 921, 950	1, 199, 983, 600	506, 395, 401	1, 652, 288, 600
1922	54, 683, 022	273, 700, 125	422, 268, 099	1, 274, 820, 000	476, 951, 121	1, 548, 520, 000
1923	93, 339, 009	506, 786, 768	564, 564, 662	1, 514, 621, 000	657, 903, 671	2, 021, 408, 000
1924	87, 926, 862	477, 230, 852	483, 686, 538	1, 062, 626, 000	571, 613, 400	1, 539, 857, 000
1925	61, 817, 149	327, 664, 512	520, 052, 741	1, 060, 402, 000	581. 869, 890	1. 388. 067. 000
1926	84, 437, 452	474, 164, 252	573, 366, 985	1, 183, 412, 000	657, 804, 437	1, 657, 576, 000

Coal produced in the United States, 1925–26, by States

[Exclusive of product of wagon mines]

State	1925		1926	
	Short tons	Value	Short tons	Value
Alabama	20, 004, 395	$42, 442, 000	21, 000, 962	$48, 036, 000
Alaska	82, 868	405, 000	87, 300	459, 000
Arkansas	1, 220, 039	4, 829, 000	1, 459, 017	5, 497, 000
California, Arizona,[1] Idaho, and Oregon	12, 625	60, 000	19, 332	71, 000
Colorado	10, 310, 551	30, 322, 000	10, 637, 225	29, 529, 000
Georgia	66, 174	220, 000	59, 869	173, 000
Illinois	66, 909, 359	146, 492, 000	69, 366, 923	148, 604, 000
Indiana	21, 224, 966	42, 884, 000	23, 186, 006	45, 889, 000
Iowa	4, 714, 843	14, 807, 000	4, 625, 487	14, 214, 000
Kansas	4, 524, 251	13, 013, 000	4, 416, 480	12, 535, 000
Kentucky	55, 068, 670	94, 825, 000	62, 924, 462	109, 740, 000
Maryland	2, 694, 572	5, 312, 000	3, 078, 353	6, 800, 000
Michigan	808, 233	3, 391, 000	686, 707	2, 829, 000
Missouri	2, 694, 215	8, 281, 000	3, 008, 495	8, 951, 000
Montana	3, 043, 686	7, 879, 000	2, 797, 760	6, 883, 000
New Mexico	2, 556, 851	8, 611, 000	2, 817, 923	8, 916, 000
North Carolina	65, 153	283, 000	57, 939	243, 000
North Dakota	1, 324, 620	2, 445, 000	1, 370, 244	2, 378, 000
Ohio	28, 034, 112	54, 057, 000	27, 872, 488	54, 759, 000
Oklahoma	2, 325, 840	7, 667, 000	2, 842, 673	9, 042, 000
Pennsylvania (bituminous)	136, 928, 019	287, 899, 000	153, 041, 638	325, 618, 000
South Dakota	14, 447	42, 000	14, 428	42, 000
Tennessee	5, 454, 011	10, 077, 000	5, 788, 741	10, 975, 000
Texas	1, 008, 375	1, 566, 000	1, 091, 158	1, 751, 000
Utah	4, 690, 342	11, 991, 000	4, 373, 793	10, 362, 000
Virginia	12, 799, 443	23, 496, 000	14, 133, 386	27, 203, 000
Washington	2, 537, 890	9, 176, 000	2, 586, 568	9, 350, 000
West Virginia	122, 380, 959	209, 655, 000	143, 509, 340	264, 736, 000
Wyoming	6, 553, 232	18, 275, 000	6, 512, 288	17, 827, 000
Total bituminous	520, 052, 741	1, 060, 402, 000	573, 366, 985	1, 183, 412, 000
Pennsylvania anthracite	61, 817, 149	327, 664, 512	84, 437, 452	474, 164, 252
Grand total	581, 869, 890	1, 388, 067, 000	657, 804, 437	1, 657, 576, 000

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[1] Production reported from Arizona for 1926 only.

Coal produced in the United States, 1925–26, by months, in short tons

Month	Pennsylvania anthracite		Bituminous	
	1925	1926	1925	1926
January	7, 234, 000	172, 000	51, 640, 000	53, 205, 000
February	7, 003, 000	2, 069, 000	38, 770, 000	46, 180, 000
March	6, 886, 000	8, 732, 000	37, 416, 000	45, 744, 000
April	7, 292, 000	8, 163, 000	33, 514, 000	39, 738, 000
May	7, 938, 000	8, 001, 000	35, 276, 000	38, 727, 000
June	7, 616, 000	8, 878, 000	36, 960, 000	41, 635, 000
July	8, 334, 000	8, 371, 000	39, 362, 000	43, 102, 000
August	9, 014, 000	8, 171, 000	44, 633, 000	45, 957, 000
September	52, 000	8, 388, 000	46, 556, 000	48, 559, 000
October	69, 000	8, 617, 000	52, 907, 000	54, 127, 000
November	153, 000	7, 397, 000	50, 497, 000	59, 213, 000
December	226, 000	7, 478, 000	52, 522, 000	57, 180, 000
	61, 817, 000	84, 437, 000	520, 053, 000	573, 367, 000

Coal imported for consumption in the United States, 1917–1926

Year	Anthracite		Bituminous		Total	
	Short tons	Value	Short tons	Value	Short tons	Value
1917	12, 530	$46, 523	1, 448, 453	$4, 795, 110	1, 460, 983	$4, 841, 633
1918	37, 272	204, 385	1, 457, 073	6, 694, 081	1, 494, 345	6, 898, 466
1919	82, 818	522, 419	1, 011, 550	4, 950, 686	1, 094, 368	5, 473, 105
1920	31, 748	257, 835	1, 244, 990	6, 733, 676	1, 276, 738	6, 991, 511
1921	8, 894	93, 103	1, 257, 589	7, 363, 945	1, 266, 483	7, 457, 048
1922	233, 528	1, 502, 192	5, 059, 999	26, 747, 374	5, 293, 527	28, 249, 566
1923	300, 360	2, 114, 080	1, 881, 465	10, 128, 516	2, 181, 825	12, 242, 596
1924	117, 914	880, 364	416, 736	2, 135, 402	534, 650	3, 015, 766
1925	382, 894	3, 212, 505	601, 737	2, 633, 980	984, 631	5, 846, 485
1926	813, 956	6, 996, 739	485, 298	2, 300, 570	1, 299, 254	9, 297, 309

Coal exported from the United States, 1917–1926

Year	Anthracite		Bituminous [1]		Total [1]	
	Short tons	Value	Short tons	Value	Short tons	Value
1917	6, 007, 306	$30, 909, 798	23, 839, 558	$79, 502, 654	29, 846, 864	$110, 412, 452
1918	4, 967, 808	29, 215, 689	22, 350, 730	78, 664, 856	27, 318, 538	107, 880, 545
1919	4, 976, 598	36, 668, 131	20, 113, 536	83, 708, 842	25, 090, 134	120, 376, 973
1920	5, 403, 749	45, 538, 100	38, 517, 084	304, 273, 241	43, 920, 833	349, 811, 341
1921	4, 677, 368	45, 624, 555	23, 131, 166	122, 597, 038	27, 808, 534	168, 221, 593
1922	2, 649, 457	25, 350, 677	12, 413, 085	65, 891, 740	15, 062, 542	91, 242, 417
1923	5, 090, 138	49, 577, 339	21, 453, 579	104, 546, 585	26, 543, 717	154, 123, 924
1924	4, 017, 785	40, 067, 804	17, 100, 347	70, 971, 302	21, 118, 132	111, 039, 106
1925	3, 179, 006	31, 760, 627	17, 461, 560	68, 402, 668	20, 640, 566	100, 163, 295
1926	4, 029, 683	41, 085, 946	35, 271, 937	155, 818, 572	39, 301, 620	196, 904, 518

[1] Exclusive of bunker coal, which has been as follows: 1917, 7,709,157 short tons, valued at $31,844,799; 1918; 6,196,036 tons, $29,868,023; 1919, 8,223,862 tons, $48,205,675; 1920, 10,485,639 tons, $82,461,518; 1921, 8,453,220 tons, $52,277,668; 1922, 4,614,632 tons, $27,912,957; 1923, 5,093,024 tons, $31,469,788; 1924, 4,460,412 tons, $22,883,293; 1925, 4,865,521 tons, $23,397,831; 1926, 7,735,606 tons, $38,025,411.

COBALT

No cobalt ores are known to have been produced in the United States in 1917 and 1922 to 1926. Production in other years since 1917 has been as follows: 1918, 4,000 short tons of cobalt ores, mined in Idaho, were reduced to 55 tons of concentrates carrying 17.74 per cent of cobalt (19,514 pounds); 1919, concentrates carrying approximately 18 per cent of cobalt were produced in Idaho, and cobalt oxide mined and reduced near Fredericktown, Mo., contained 28 pounds of cobalt, valued at $122,452; 1920, 102,410 pounds of cobalt in oxide and hydrate, valued at $262,801, was recovered from ore mined near Fredericktown, Mo.; 1921, 42,086 pounds of heterogenite (cobalt oxide), containing 4,018 pounds of cobalt, was mined near Goodsprings, Nev.; it was shipped in 1922 and sold for $1,419.

Cobalt ore, cobalt, and oxide imported for consumption in the United States, 1917–1926

Year	Ore		Cobalt		Oxide		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
1917	(1)	(1)	223,794	$369,950	276,406	$275,821	500,200	$645,771
1918	(1)	(1)	504,391	628,099	208,596	291,699	712,987	919,798
1919	17,045	$2,832	60,511	141,450	131,424	184,751	208,980	329,033
1920	13,039	4,794	143,603	326,864	202,724	399,605	[2] 359,586	[2] 731,277
1921	7,657	3,235	38,442	105,539	164,003	342,426	210,102	451,200
1922	5,195	7,075	126,364	321,396	217,530	435,895	[3] 349,089	[3] 764,366
1923	58,719	56,326	225,639	552,434	258,574	511,903	[3] 542,932	[3] 1,120,663
1924	28,786	37,276	118,952	264,935	226,703	440,898	[3] 374,441	[3] 743,109
1925	34,782	31,320	198,669	422,185	287,265	546,292	[3] 520,710	[3] 999,797
1926	154,468	55,820	387,076	820,873	333,132	632,478	[2, 3] 874,786	[2, 3] 1,509,211

[1] Ore included with cobalt; not separately recorded until July, 1918. From July to December, 1918, imports are recorded as follows: Ore, 220,115 pounds, valued at $55,188; metal, 250,920 pounds, $498,316.

[2] Includes 220 pounds of zaffer, valued at $14, in 1920, and 110 pounds valued at $40, in 1926. Imports of zaffer not separately recorded for 1917 and 1918, and none imported 1919 and 1921 to 1925.

[3] Also 11 pounds of "other salts and compounds," valued at $26, imported Sept. 22 to Dec. 31, 1922. Not separately classified prior to change in tariff. Similar additional imports in 1923 were 45,644 pounds, valued at $27,356; in 1924, 797 pounds, $856; in 1925, 13,256 pounds, $7,894; and in 1926, 37,342 pounds, $21,647.

COKE AND COKE-OVEN BY-PRODUCTS

COKE

Coke produced in the United States, 1917–1926

Year	Beehive		By-product		Total	
	Short tons	Value	Short tons	Value	Short tons	Value
1917	33,167,548	$159,599,864	22,439,280	$138,643,153	55,606,828	$298,243,017
1918	30,480,792	189,305,583	25,997,580	193,018,785	56,478,372	382,324,368
1919	19,042,936	98,094,972	25,137,621	160,244,768	44,180,557	258,339,740
1920	20,511,092	162,952,483	30,833,951	313,028,732	51,345,043	475,981,215
1921	5,538,042	30,166,449	19,749,580	117,506,046	25,287,622	147,673,095
1922	8,573,467	50,036,556	28,550,545	188,276,767	37,124,012	238,313,323
1923	19,379,870	115,905,580	37,597,664	257,591,318	56,977,534	373,496,898
1924	10,286,037	48,351,552	33,983,568	195,690,009	44,269,605	244,041,561
1925	11,354,784	51,731,566	39,912,159	210,827,571	51,266,943	262,559,137
1926	12,488,951	57,024,869	44,376,586	250,748,533	56,865,537	307,773,402

Coke produced in the United States, 1925–26, by States

State	1925		1926	
	Short tons	Value [1]	Short tons	Value [1]
Alabama	4,670,481	$16,801,841	(2)	(2)
Colorado	644,481	(3)	790,118	(3)
Georgia	4,925	38,464	3,059	$23,034
Illinois	3,011,497	22,568,845	3,336,962	25,050,474
Indiana	5,141,940	36,635,104	5,990,344	44,143,059
Kentucky	(2)	(2)	(2)	(2)
Maryland	1,019,209	(3)	1,120,610	(3)
Massachusetts	535,302	(3)	573,748	(3)
Michigan	1,751,118	11,708,519	1,826,638	12,713,083

[1] Includes operators' statements of value for that portion of product not sold (such as coke consumed by producer in associated iron furnaces).

[2] Included under "Combined States."

[3] Included under "Undistributed."

Coke produced in the United States, 1925–26, by States—Continued

State	1925		1926	
	Short tons	Value	Short tons	Value
Minnesota	518, 355	$4, 992, 024	619, 905	$6, 014, 738
Missouri	(2)	(2)	(2)	(2)
New Jersey	903, 997	(3)	913, 250	(3)
New Mexico	(2)	(2)	(2)	(2)
New York	2, 219, 409	12, 968, 066	2, 827, 805	17, 455, 226
Ohio	7, 261, 187	(3)	7, 632, 806	(3)
Pennsylvania	19, 427, 603	76, 394, 478	21, 922, 976	96, 318, 119
Rhode Island	(2)	(2)	(2)	(2)
Tennessee	216, 488	1, 161, 100	241, 034	1, 233, 499
Utah	314, 159	(3)	306, 231	(3)
Virginia	421, 691	1, 901, 623	370, 983	1, 716, 716
Washington	79, 257	617, 265	67, 286	518, 053
West Virginia	1, 546, 032	6, 648, 745	1, 713, 461	6, 918, 103
Wisconsin	(2)	(2)	(2)	(2)
Combined States	1, 579, 812	11, 560, 031	6, 608, 321	29, 775, 733
Undistributed		58, 563, 032		65, 893, 565
	51, 266, 943	262, 559, 137	56, 865, 537	307, 773, 402

[2] Included under "Combined States."
[3] Included under "Undistributed."

Coke produced in the United States, 1925–26, by States and kinds

State	Beehive				By-product			
	1925		1926		1925		1926	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
Alabama	88, 328	$453, 870	(1)	(1)	4, 582, 153	$16, 347, 971	4, 779, 986	$16, 823, 492
Colorado	154, 824	(2)	197, 179	(2)	489, 657	(2)	592, 939	(2)
Georgia	4, 925	38, 464	3, 059	$23, 034				
Illinois					3, 011, 497	22, 568, 845	3, 336, 962	25, 050, 474
Indiana					5, 141, 940	36, 635, 104	5, 990, 344	44, 143, 059
Kentucky	(1)	(1)	147, 540	600, 169	(1)	(1)	(1)	(1)
Maryland					1, 019, 209	(2)	1, 120, 610	(2)
Massachusetts					535, 302	(2)	573, 748	(2)
Michigan					1, 751, 118	11, 708, 519	1, 826, 638	12, 713, 083
Minnesota					518, 355	4, 992, 024	619, 905	6, 014, 738
Missouri					(1)	(1)	(1)	(1)
New Jersey					903, 997	(2)	913, 250	(2)
New Mexico	(1)	(1)	(1)	(1)				
New York					2, 219, 409	12, 968, 066	2, 827, 805	17, 455, 226
Ohio	156, 058	(2)	84, 970	(2)	7, 105, 129	34, 190, 691	7, 547, 836	40, 344, 524
Pennsylvania	9, 574, 341	41, 875, 615	10, 722, 352	47, 595, 184	9, 853, 262	34, 518, 863	11, 200, 624	48, 722, 935
Rhode Island					(1)	(1)	(1)	(1)
Tennessee	127, 609	690, 041	122, 410	605, 017	88, 879	471, 059	118, 624	628, 482
Utah	146, 009	1, 240, 256	121, 475	1, 033, 284	168, 150	(2)	184, 756	(2)
Virginia	421, 691	1, 901, 623	370, 983	1, 716, 716				
Washington	38, 500	327, 483	24, 702	214, 429	40, 757	289, 782	42, 584	303, 624
West Virginia	490, 040	2, 168, 879	583, 599	2, 652, 219	1, 055, 992	4, 479, 866	1, 129, 862	4, 265, 884
Wisconsin					(1)	(1)	(1)	(1)
Combined States	152, 459	1, 004, 350	110, 682	730, 590	1, 427, 353	10, 555, 681	1, 570, 113	11, 621, 482
Undistributed		2, 030, 985		1, 854, 227		21, 101, 100		22, 661, 530
	11, 354, 784	51, 731, 566	12, 488, 951	57, 024, 869	39, 912, 159	210, 827, 571	44, 376, 586	250, 748, 533

[1] Included under "Combined States."
[2] Included under "Undistributed."

Coke produced in the United States, 1925–26, by months, in short tons

Month	1925			1926		
	Beehive	By-product	Total	Beehive	By-product	Total
January	1, 241, 000	3, 404, 000	4, 645, 000	1, 500, 000	3, 796, 000	5, 296, 000
February	1, 117, 000	3, 118, 000	4, 235, 000	1, 524, 000	3, 492, 000	5, 016, 000
March	1, 066, 000	3, 449, 000	4, 515, 000	1, 259, 000	3, 772, 000	5, 031, 000
April	854, 000	3, 308, 000	4, 162, 000	1, 068, 000	3, 604, 000	4, 672, 000
May	710, 000	3, 280, 000	3, 990, 000	964, 000	3, 725, 000	4, 689, 000
June	632, 000	3, 151, 000	3, 783, 000	882, 000	3, 614, 000	4, 496, 000
July	561, 000	3, 167, 000	3, 728, 000	856, 000	3, 771, 000	4, 627, 000
August	641, 000	3, 159, 000	3, 800, 000	818, 000	3, 742, 000	4, 560, 000
September	794, 000	3, 178, 000	3, 972, 000	892, 000	3, 640, 000	4, 532, 000
October	1, 068, 000	3, 395, 000	4, 463, 000	943, 000	3, 799, 000	4, 742, 000
November	1, 286, 000	3, 550, 000	4, 836, 000	935, 000	3, 730, 000	4, 665, 000
December	1, 385, 000	3, 753, 000	5, 138, 000	848, 000	3, 692, 000	4, 540, 000
	11, 355, 000	39, 912, 000	51, 267, 000	12, 489, 000	44, 377, 000	56, 866, 000

Coke imported into and exported from the United States, 1917–1926

Year	Imports for consumption		Exports	
	Short tons	Value	Short tons	Value
1917	24, 872	$146, 451	1, 409, 320	$8, 543, 746
1918	30, 168	221, 880	1, 687, 824	11, 861, 408
1919	16, 486	140, 653	716, 956	5, 128, 119
1920	41, 143	403, 175	919, 802	9, 993, 665
1921	30, 990	336, 394	306, 755	2, 760, 939
1922	94, 228	802, 987	511, 541	4, 319, 538
1923	85, 002	862, 596	1, 237, 342	11, 889, 897
1924	82, 833	795, 477	659, 350	4, 926, 478
1925	201, 579	1, 609, 474	953, 812	6, 871, 962
1926	284, 548	2, 174, 350	987, 260	6, 979, 896

COKE-OVEN BY-PRODUCTS

By-products from coke-oven operations in the United States, 1925–26

Product	Produced	Sold	
		Quantity	Value
1925			
Tar gallons	480,848,814	240,160,986	$11,903,196
Ammonia:			
Sulphate pounds	1,017,014,550	989,676,520	22,546,908
Ammonia liquor (NH_3 content) do	65,255,767	54,809,335	4,966,885
Sulphate equivalent of all forms do	(1,278,037,618)	(1,208,913,860)	27,513,793
Gas:			
Distributed through city mains M cu. ft	[1] 639,644,062	77,457,262	29,319,309
Used in steel or affiliated plant do		230,030,325	26,380,657
Used under boilers, etc do		25,239,072	1,451,253
Sold for industrial use do		29,527,613	4,333,000
			61,484,219
Light oil and derivatives:			
Crude light oil gallons	[2] 146,443,106	10,201,900	1,052,585
Benzol crude do	6,119,160	5,907,106	1,321,597
Benzol refined do	16,231,714	15,909,280	3,566,643
Motor benzol do	81,469,925	80,957,983	13,441,422
Toluol crude do	127,584	46,789	10,052
Toluol refined do	5,329,560	4,991,358	1,300,734
Solvent naphtha do	4,744,431	3,993,735	805,251
Other light-oil products do	2,366,246	1,252,451	96,073
			21,594,357
Naphthalene crude pounds	9,238,890	9,692,185	92,369
Naphthalene refined do	1,018	208,332	5,124
			97,493
Other products			132,466
			[3] 122,725,524
1926			
Tar gallons	529,486,374	277,248,522	14,103,760
Ammonia:			
Sulphate pounds	1,167,859,453	1,152,141,717	24,658,031
Ammonia liquor (NH_3 content) do	53,523,229	53,448,034	3,470,172
Sulphate equivalent of all forms do	(1,381,952,369)	(1,365,933,853)	28,128,203
Gas:			
Distributed through city mains M cu. ft	[1] 706,681,828	89,565,953	29,978,997
Used in steel or affiliated plant do		249,840,649	27,955,574
Used under boilers, etc do		25,953,876	1,438,699
Sold for industrial use do		32,553,610	5,313,530
			64,686,800
Light oil and derivatives:			
Crude light oil gallons	[2] 164,059,552	10,783,568	1,330,208
Benzol crude do	4,744,713	4,660,621	1,109,974
Benzol refined do	17,713,904	17,327,169	3,957,719
Motor benzol do	90,029,972	89,501,212	16,863,109
Toluol crude do	432,317	400,308	127,298
Toluol refined do	8,359,135	8,250,297	2,787,454
Solvent naphtha do	4,704,555	3,546,117	1,035,870
Other light-oil products do	4,127,710	1,324,303	93,344
			27,304,976
Naphthalene crude pounds	7,746,821	7,556,372	96,210
Naphthalene refined do	139,701	166,851	1,100
			97,310
Other products			148,720
			[3] 134,469,769

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[1] Inclusive of gas wasted and gas used for heating retorts.

[2] Of the crude light oil 143,296,567 gallons in 1925 and 159,589,756 gallons in 1926 was refined on the premises to make the derived products listed.

[3] Exclusive of value of coke breeze.

COLUMBITE

[See Tantalum]

COPPER [1]

Summary of statistics of the copper industry in the United States, 1924–1926

	1924	1925	1926
Production of copper:			
Smelter output..........pounds..	1, 634, 249, 192	1, 674, 869, 886	1, 739, 622, 094
Mine production..........do....	1, 606, 165, 018	1, 678, 117, 747	1, 725, 275, 931
Refinery production of new copper—			
Electrolytic..........do....	1, 499, 223, 447	1, 533, 995, 439	1, 553, 041, 424
Lake..........do....	145, 333, 227	138, 029, 764	172, 372, 304
Casting..........do....	29, 657, 925	10, 870, 144	5, 883, 433
Total domestic..........do....	1, 674, 214, 599	1, 682, 895, 347	1, 731, 297, 161
Total domestic and foreign..........do....	2, 260, 076, 010	2, 204, 573, 824	2, 322, 485, 376
Total new and old copper..........do....	3, 037, 000, 000	3, 045, 000, 000	3, 282, 000, 000
Ore produced:			
Copper ore..........short tons..	49, 178, 315	53, 103, 014	57, 181, 894
Average yield of copper..........per cent..	1. 59	1. 54	1. 46
Copper-lead and copper-zinc ores..........short tons..	219, 874	228, 612	282, 015
Average price per pound..........cents..	13. 1	14. 2	14. 0
General imports (unmanufactured)..........pounds..	768, 813, 731	652, 971, 407	779, 441, 803
Exports of metallic copper [2]..........do....	1, 116, 775, 136	1, 082, 369, 439	960, 220, 112
Withdrawn from total supply on domestic account:			
Total new copper..........pounds..	1, 354, 742, 564	1, 401, 012, 091	1, 570, 136, 207
Total new and old copper..........do....	2, 131, 000, 000	2, 241, 000, 000	2, 530, 000, 000
Stocks at end of year:			
Refined copper..........do....	243, 000, 000	124, 000, 000	146, 000, 000
Blister and material in solution..........do....	393, 000, 000	432, 000, 000	455, 000, 000
World's production (smelter)..........do....	2, 985, 058, 000	3, 090, 880, 000	3, 192, 293, 000
Value of smelter production from domestic ores..........	$214, 087, 000	$237, 832, 000	$243, 547, 000

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[1] For prices of copper, see statement on p. A12.

[2] Total exports of copper, exclusive of ore, concentrates, composition metal, and a small quantity of unrefined copper for which figures are not separable from those for ore and concentrates. In 1926 exclusive also of "Other manufactures of copper" for which figures for quantity are not recorded.

Copper produced in the United States from domestic ores, 1917–1926

[Smelter output, in pounds fine]

Year	Pounds	Value	Year	Pounds	Value
1917..........	1, 886, 120, 721	$514, 911, 000	1922..........	950, 285, 947	$128, 289, 000
1918..........	1, 908, 533, 595	471, 408, 000	1923..........	1, 434, 999, 962	210, 945, 000
1919..........	1, 286, 419, 329	239, 274, 000	1924..........	1, 634, 249, 192	214, 087, 000
1920..........	1, 209, 061, 040	222, 467, 000	1925..........	1, 674, 869, 886	237, 832, 000
1921..........	505, 586, 098	65, 221, 000	1926..........	1, 739, 622, 094	243, 547, 000

Copper produced in the United States from domestic ores, 1922–1926, by States

[Smelter output, in pounds fine]

State	1922	1923	1924	1925	1926
Alaska	59, 900, 579	68, 648, 368	77, 053, 492	72, 204, 166	67, 631, 846
Arizona	428, 200, 634	615, 493, 561	672, 365, 115	722, 653, 457	729, 324, 537
California	20, 440, 430	27, 042, 835	49, 433, 716	46, 943, 604	30, 442, 961
Colorado	3, 635, 916	4, 343, 418	4, 158, 612	3, 163, 211	4, 657, 591
Georgia	8, 147				
Idaho	3, 504, 944	3, 664, 079	3, 148, 519	3, 144, 064	1, 171, 262
Michigan	122, 545, 126	137, 691, 306	145, 333, 227	138, 029, 764	174, 778, 884
Missouri	1, 070, 259	217, 449	184, 947	12, 114	54, 378
Montana	165, 341, 414	224, 353, 764	249, 322, 394	270, 604, 676	257, 271, 936
Nevada	20, 398, 611	63, 495, 928	77, 281, 479	77, 137, 563	109, 041, 769
New Mexico	29, 127, 329	57, 521, 171	78, 145, 629	76, 467, 245	82, 848, 096
North Carolina		61, 913			1, 468, 746
Oregon	925, 954	1, 182, 437	716, 656	126, 107	279, 223
Pennsylvania	888, 721	1, 121, 573	1, 263, 535	562, 240	495, 698
South Dakota		47	4, 199	2, 336	2, 714
Tennessee	14, 226, 232	18, 721, 932	18, 251, 996	19, 789, 234	18, 601, 586
Texas	3, 889	4, 216	302	785	17, 102
Utah	79, 665, 563	210, 118, 291	256, 531, 349	242, 730, 986	259, 649, 158
Vermont					446, 323
Washington	369, 133	839, 254	978, 647	1, 184, 807	1, 336, 617
Wyoming		87, 686		331	
Undistributed	33, 066	390, 734	75, 378	113, 196	101, 667
	950, 285, 947	1, 434, 999, 962	1, 634, 249, 192	1, 674, 869, 886	1, 739, 622, 094

Primary and secondary copper produced by regular refining plants in the United States and imported, 1922–1926, in pounds

	1922	1923	1924	1925	1926
Primary:					
Domestic—[1]					
Electrolytic	766, 944, 836	1, 302, 454, 492	1, 499, 223, 447	1, 533, 995, 439	1, 553, 041, 424
Lake	122, 545, 126	137, 691, 306	145, 333, 227	138, 029, 764	172, 372, 304
Casting	15, 180, 723	24, 019, 197	29, 657, 925	10, 870, 144	5, 883, 433
	904, 670, 685	1, 464, 164, 995	1, 674, 214, 599	1, 682, 895, 347	1, 731, 297, 161
Foreign—[1]					
Electrolytic	345, 641, 677	509, 873, 512	577, 100, 034	516, 632, 530	588, 932, 788
Casting and best select	5, 203, 597	5, 797, 109	8, 761, 377	5, 045, 947	2, 255, 427
Total refinery production of new copper	1, 255, 515, 959	1, 979, 835, 616	2, 260, 076, 010	2, 204, 573, 824	2, 322, 485, 376
Imports of refined copper	103, 143, 142	[2] 160, 711, 227	145, 909, 968	99, 773, 546	170, 565, 766
Total new refined copper made available	1, 358, 659, 101	2, 140, 546, 843	2, 405, 985, 978	2, 304, 347, 370	2, 493, 051, 142
Secondary:					
Electrolytic	100, 792, 685	85, 297, 052	104, 281, 430	140, 349, 541	163, 061, 465
Casting	45, 217, 857	46, 141, 409	50, 536, 678	58, 010, 653	62, 056, 941
	146, 010, 542	131, 438, 461	154, 818, 108	198, 360, 194	225, 118, 406
	1, 504, 669, 643	2, 271, 985, 304	2, 560, 804, 086	2, 502, 707, 564	2, 718, 169, 548

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[1] The separation of refined copper into metal of domestic and foreign origin is only approximate, as an accurate separation at this stage of manufacture is not possible.

[2] Figures of imports of refined copper from Chile for 1923, as reported by the Chile Exploration Co., have been included here in place of those of the Bureau of Foreign and Domestic Commerce for Chile, which are undoubtedly very low.

In addition to their output of metallic copper the regular refining companies produced bluestone having copper content as follows: 1922, 8,508,000 pounds; 1923, 7,987,000 pounds; 1924, 5,766,000 pounds; 1925, 6,754,000 pounds; 1926, 8,498,000 pounds.

Stocks of copper in the United States, January 1, 1918–1927, in pounds

Year	Refined copper	Blister and material in process of refining
1918	114,000,000	411,000,000
1919	180,000,000	562,600,000
1920	631,000,000	273,000,000
1921	659,000,000	465,000,000
1922	459,000,000	283,000,000
1923	216,000,000	361,000,000
1924	264,000,000	432,000,000
1925	243,000,000	393,000,000
1926	124,000,000	432,000,000
1927	146,000,000	455,000,000

New refined copper withdrawn from total year's supply on domestic account in the United States, 1922–1926, in pounds

	1922	1923	1924	1925	1926
Total supply of new copper	1,358,659,101	2,140,546,843	2,405,985,978	2,304,347,370	2,493,051,142
Stocks at beginning of year	459,000,000	216,000,000	264,000,000	243,000,000	124,000,000
Total available supply	1,817,659,101	2,356,546,843	2,669,985,978	2,547,347,370	2,617,051,142
Copper exported [1]	705,025,268	[2] 792,073,512	[2] 1,072,243,414	[2] 1,022,335,279	[2] 900,914,935
Stocks at end of year	216,000,000	264,000,000	243,000,000	124,000,000	146,000,000
	921,025,268	1,056,073,512	1,315,243,414	1,146,335,279	1,046,914,935
Withdrawn on domestic account	896,633,833	1,300,473,331	1,354,742,564	1,401,012,091	1,570,136,207

[1] Includes unrefined black blister and converter copper (bars, pigs, and other forms) and refined in ingots, bars, rods, or other forms.

[2] Exclusive of small quantity of unrefined black blister for which figures are not separable from those for ore and concentrates.

Copper (in unmanufactured form) imported for consumption in the United States, 1917–1926

Year	Pounds	Value
1917	552,789,561	$134,990,680
1918	569,182,467	131,064,639
1919	437,570,497	88,751,115
1920	480,297,985	88,782,609
1921	350,582,746	45,660,326
1922	542,932,525	$65,786,811
1923	671,929,223	95,398,681
1924	765,685,592	95,608,460
1925	651,005,759	83,948,686
1926	779,437,231	99,679,746

Copper (unmanufactured) imported into the United States, 1925–26, in pounds

[General imports]

Country	Ore (copper content)	Concentrates (copper content)	Matte and regulus (copper content)	Unrefined black copper and copper in bars, pigs, or other forms	Refined in bars, plates, rods, or other forms	Old and clippings for remanufacture	Composition metal, copper chief value
1925							
Africa:							
British South	65,055	38,950	----------	----------	----------	----------	----------
Portuguese—							
East	383,444	39,897	----------	92,769,600	----------	----------	----------
Other	----------	10,785	----------	----------	----------	----------	----------
Australia	900	----------	227,231	224,415	----------	----------	----------
Canada	41,571,234	2,449,488	96,548	50,500,684	10,110	5,680,470	10,012
Chile	44,554,953	215,560	265,955	59,800,141	96,170,761	285,823	----------
Cuba	5,985,806	25,176,103	----------	----------	----------	2,091,015	57,549
France	229,939	472,400	87,448	100,439	----------	----------	----------
Germany	70,810	128,312	----------	1,160	24,640	1,391,205	241
Mexico	2,220,156	24,771,676	80,000	71,777,809	----------	104,454	20,430
Peru	593,071	82,582	178,750	72,324,746	----------	1,129	----------
Spain	8,897,949	----------	----------	14,419,651	----------	----------	----------
United Kingdom	407,187	107,626	32,259	3,898,193	22,460	520,741	112
Venezuela	----------	----------	----------	1,068,971	----------	----------	4,732
Other	2,661,832	460,243	764,797	12,447,691	3,545,575	353,629	13,873
	107,642,336	53,953,622	1,732,988	379,333,500	99,773,546	10,428,466	106,949
Total value	$13,582,361	$6,491,514	$212,725	$48,870,358	$13,831,407	$1,188,711	$12,086
1926							
Africa:							
British South	----------	----------	----------	52,601,821	----------	2,967	----------
Portuguese—							
East	----------	20,271	----------	83,314,732	910,206	----------	----------
Other	----------	----------	----------	449,642	----------	150	----------
Australia	248,646	----------	140,720	----------	----------	----------	----------
Canada	47,609,027	7,963,626	107,655	44,961,092	685	6,002,507	135,503
Chile	33,074,184	848,861	202,836	31,365,100	166,872,641	343,351	----------
Cuba	5,433,042	14,471,381	----------	----------	----------	1,926,861	10,980
France	1,146,285	37,300	42,114	1,131,955	----------	----------	----------
Germany	107,742	623,836	----------	216,325	59,387	205,171	70,273
Mexico	2,862,187	18,821,148	971,943	82,320,581	210,874	68,624	----------
Peru	1,066,055	358,562	99,945	93,907,544	----------	6,579	----------
Spain	13,480,257	----------	----------	24,783,133	----------	----------	----------
United Kingdom	270,617	183,644	250,783	27,743,879	2,069,115	890,199	111,244
Venezuela	276	1,345,408	----------	----------	----------	1,667	----------
Other	1,417,040	76,440	313,046	1,002,493	442,858	1,553,513	153,274
	106,715,358	44,750,477	2,129,042	443,798,297	170,565,766	11,001,589	481,274
Total value	$13,452,075	$5,351,557	$261,443	$56,101,041	$23,335,640	$1,114,436	$63,769

Copper exported from the United States, 1917–1926

Year	Pounds	Value	Year	Pounds	Value
1917	1,132,832,663	$338,723,756	1922	743,039,888	$103,874,007
1918	747,689,580	195,840,637	1923	829,314,002	129,219,975
1919	516,627,775	117,417,055	1924	1,116,915,484	156,645,684
1920	624,053,701	127,468,606	1925	1,084,208,532	161,165,820
1921	628,804,750	85,351,928	1926[1]	965,685,264	139,853,365

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[1] Exclusive of "Other manufactures of copper," valued at $1,350,391, for which quantity is not recorded.

Copper exported from the United States, 1925–26, in pounds

Country	Ore, concentrates, composition metal, and unrefined copper (copper content)	Refined, in bars, ingots, or other forms	Old and scrap	Pipes and tubes	Plates and sheets	Wire (except insulated)	Insulated wire and cable	Rods	Other manufactures of copper
1925									
Belgium	78,710	90,950,918	55,683	-------	572,357	14,090	6,242	717,060	1,099
Canada	249,309	24,300,632	4,066,687	1,340,360	1,631,351	1,962,493	1,406,713	7,431,159	1,654,410
China	-------	12,133,124	505,476	1,513	41,937	13,442	1,129,137	143	19,821
Denmark	-------	1,639,533	-------	-------	1,556	3,951	17,382	2,818,405	9,315
France	224,598	145,809,549	373,539	59	448,222	2,573	189,603	785,943	5,517
Germany	1,046,118	229,291,382	4,188,651	-------	3,935,655	90,975	57,991	1,119,902	173,106
India (British)	-------	3,644,858	223,818	4,394	1,643,612	57,923	82,557	-------	39,806
Italy	-------	126,472,202	398,772	-------	656,791	370	17,336	280,469	23,833
Japan	1,604	8,493,760	5,688	1,978	7,548	12,319	48,163	-------	4,354
Netherlands	237,547	92,279,396	220,282	4,412	1,546,956	3,620	24,273	313,992	6,671
Norway	-------	1,829,841	-------	2,243	-------	89,885	70,519	1,602,075	1,950
Spain	-------	7,077,977	349,956	-------	280	43,797	217,056	63,011	19,182
Sweden	-------	29,105,773	-------	-------	3,200	724	9,097	280,115	13,804
Switzerland	-------	1,688,373	57,902	-------	-------	500	8,703	-------	1,931
United Kingdom	-------	183,752,066	1,151,127	12,625	414,523	92,790	1,079,650	34,254,775	142,082
Other	1,207	9,596,053	507,880	1,416,441	1,301,295	9,276,127	13,452,571	4,602,793	1,339,938
Total value	1,839,093 $232,636	968,065,437 $140,220,827	12,105,461 $1,555,999	2,784,025 $697,057	12,205,283 $2,331,190	11,665,579 $2,094,108	17,816,993 $4,900,264	54,269,842 $8,098,281	3,456,819 $1,035,458
1926									
Belgium	-------	82,058,980	18,632	-------	44,852	868	6,782	22,852	(1)
Canada	163,043	15,288,339	2,811,469	2,286,220	1,578,837	765,636	1,749,467	11,517,562	
China	-------	8,167,056	36,520	15,852	26,628	69,510	280,205	-------	
Denmark and Faroe Islands	-------	867,701	-------	-------	1,225	67,382	28,291	1,343,675	
France	109,673	175,150,816	365,933	57	818,086	163,324	134,872	2,783,828	
Germany	4,610,828	153,360,480	8,745,244	2,360	504,581	37,753	4,515	-------	
India (British)	-------	4,415,087	22,820	3,429	222,871	625,433	195,536	-------	
Italy	-------	82,957,238	33,030	120	336,721	40,966	7,488	111,031	
Japan, including Chosen	2,295	37,343,661	5,043,581	90	9,460	656,635	65,357	1,590	
Netherlands	-------	64,286,443	572,846	5,057	38,042	338,030	48,961	112,181	
Norway	-------	951,333	-------	1,313	-------	335	23,485	932,458	
Spain	-------	9,656,520	-------	153	-------	146	15,800	1,503	
Sweden	112,323	24,711,844	-------	49	3,087	4,462	15,858	-------	
Switzerland	-------	-------	-------	-------	-------	2,944	43,925	-------	
United Kingdom	466,864	180,320,237	1,424,703	20,417	464,157	1,444,833	792,457	19,733,655	
Other	126	16,588,793	351,334	918,101	983,643	8,822,871	15,139,530	8,230,072	
Total value	5,465,152 $611,630	856,124,528 $121,231,224	19,426,112 $2,178,330	3,253,218 $839,953	5,032,190 $1,075,143	13,041,128 $2,244,235	18,552,529 $4,816,128	44,790,407 $6,856,722	(1) $1,350,391

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[1] Figures for quantity not recorded.

CORUNDUM

[See Abrasive materials]

CRYOLITE

No natural cryolite is produced in the United States, the entire supply in this country being imported from Greenland. Artificial cryolite is produced by electrochemical processes.

Cryolite imported for consumption in the United States, 1917–1926

Year	Long tons	Value	Year	Long tons	Value
1917	4,383	$218,500	1922	3,899	$196,302
1918	1,950	97,500	1923	6,375	319,959
1919	2,131	106,956	1924	6,320	320,670
1920	3,864	193,638	1925	9,844	690,651
1921	3,460	295,186	1926	7,599	557,598

DIATOMITE (INFUSORIAL EARTH)

[See Abrasive materials]

EMERY

[See Abrasive materials]

FELDSPAR

Crude feldspar sold or used by producers in the United States, 1917–1926

Year	Long tons	Value	Year	Long tons	Value
1917	126,715	$474,767	1922	117,127	$844,568
1918	88,498	429,989	1923	145,004	1,057,595
1919	63,441	347,992	1924	204,772	1,509,339
1920	135,551	851,123	1925	185,706	1,315,654
1921	91,865	617,652	1926	209,989	1,607,101

The foreign trade of the United States in feldspar is small and limited largely to importing from Canada. Imports have been as follows: 1926, 29,941 long tons of crude feldspar, valued at $251,896; 1925, 24,994 tons, $203,524; 1924, 35,139 tons, $284,716; 1923, 24,271 tons, $184,924. Prior to September 22, 1922, imports of feldspar were not specifically classified in the official records and are therefore unknown. From that date to the end of the year the imports amounted to 7,549 long tons of crude, valued at $60,111, and 37 long tons of crushed or ground, valued at $538. No imports of crushed or ground feldspar were recorded from 1923 to 1925 but 36 long tons, valued at $1,743, was imported in 1926.

There is no record of exports of feldspar, and if any feldspar is exported the quantity is doubtless negligible.

FERRO-ALLOYS

Ferro-alloys shipped from furnaces in the United States, 1917–1926, in long tons [1]

Year	Ferro-manganese	Spiegel-eisen	Other varieties	Total	
				Quantity	Value
1917 [1]	260, 225	189, 241	184, 555	634, 021	$83, 731, 724
1918 [1]	306, 076	263, 861	180, 931	750, 868	115, 433, 943
1919	198, 255	90, 855	130, 528	419, 638	53, 730, 964
1920	276, 594	103, 672	232, 542	612, 808	77, 519, 367
1921	111, 374	69, 230	68, 023	248, 627	21, 697, 785
1922	161, 612	70, 253	191, 415	423, 280	28, 259, 004
1923	226, 365	134, 086	219, 366	579, 817	49, 877, 231
1924	232, 821	76, 179	188, 244	497, 244	43, 249, 948
1925	254, 005	95, 890	266, 327	616, 222	53, 048, 100
1926	330, 070	82, 982	276, 206	689, 258	61, 368, 407

[1] The figures for 1917 and 1918 fall short of the actual production of the United States, as the output of certain electrically produced ferro-alloys is not available for publication.

Ferro-alloys shipped from furnaces in the United States, 1925–26

Variety of alloy	1925		1926	
	Long tons	Value	Long tons	Value
Ferromanganese	254, 005	$26, 006, 439	330, 070	$31, 711, 871
Silico-manganese			2, 183	354, 364
Silico-spiegeleisen				
Spiegeleisen	95, 890	2, 407, 226	82, 982	2, 016, 088
Ferrosilicon (7 per cent or more silicon)	221, 387	11, 405, 060	233, 428	12, 119, 465
Ferromolybdenum and calcium-molybdenum compounds	210	236, 957	1, 096	1, 051, 881
Ferrotungsten	1, 238	1, 991, 123	1, 771	2, 900, 053
Ferrovanadium	1, 841	4, 843, 635	1, 777	4, 721, 903
Other varieties [1]	41, 651	6, 157, 660	35, 951	6, 492, 782
	616, 222	53, 048, 100	689, 258	61, 368, 407

[1] 1925: Ferrochromium, ferrophosphorus, ferrotitanium, ferrouranium, ferrozirconium, and zirconium-ferrosilicon; 1926: Ferrochromium, ferrophosphorus, ferrotitanium, ferrozirconium, and zirconium-ferrosilicon.

Value of ferro-alloys imported for consumption in the United States, 1917–1926

Year	Value	Year	Value
1917	$6, 703, 330	1922	$7, 789, 632
1918	4, 932, 042	1923	9, 879, 433
1919	5, 384, 693	1924	5, 509, 020
1920	10, 397, 896	1925	7, 133, 618
1921	1, 576, 131	1926	6, 303, 757

Ferro-alloys imported for consumption in the United States, 1925–26

Variety of alloy	1925		1926	
	Long tons	Value	Long tons	Value
Ferromanganese (manganese content)	62, 970	$6, 033, 147	47, 768	$4, 410, 142
Spiegeleisen	1, 090	39, 841	8, 783	256, 714
Ferrochrome and chromium:				
Ferrochrome—				
Containing 3 per cent or more carbon (chromium content)	69	11, 405	15	2, 569
Containing less than 3 per cent carbon	588	129, 510	495	120, 235
Chrome or chromium metal	3	4, 769	1	765
Chromium vanadium	32	5, 065	20	2, 811
Ferrosilicon (silicon content)	4, 556	585, 193	13, 038	1, 375, 227
Molybdenum and ferromolybdenum (molybdenum content)	(1)	1, 184	(2)	987
Titanium and ferrotitanium	17	6, 698	23	9, 189
Tungsten and ferrotungsten (tungsten content)	375	316, 806	156	125, 118
		7, 133, 618		6, 303, 757

[1] 274 pounds.

[1] 604 pounds.

Ferro-alloys exported from the United States, 1917–1926

Variety of alloy	1917		1918		1919		1920		1921	
	Long tons	Value	Long tons	Value	Long tons	Value	Long tons	Value	Long tons	Value
Ferromanganese	[1] 2,400	[1] $498,402	3,577	$806,087	2,999	$445,840	3,454	$642,570	690	$100,474
Spiegeleisen	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Ferrochrome and chrome metal	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Ferrosilicon	[1] 6,849	[1] 719,626	4,107	443,456	1,544	145,310	632	41,057	368	20,204
Tungsten and ferro-tungsten	1,038	4,122,653	550	2,545,087	17	113,276	2	5,913	------	--------
Ferrovanadium	1,084	2,953,260	675	1,774,062	29	95,560	173	705,385	98	424,886

Variety of alloy	1922		1923		1924		1925		1926	
	Long tons	Value	Long tons	Value	Long tons	Value	Long tons	Value	Long tons	Value
Ferromanganese	1,107	$76,822	4,295	$151,224	3,165	$92.421	5,496	$160,568	693	$44,111
Spiegeleisen	289	7,740								
Ferrochrome and chrome metal	23	1,941	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Ferrosilicon	689	30,939	814	31,154	775	29,214	(3)	(3)	(3)	(3)
Tungsten and ferrotungsten	(4)	43,219	[5] 2	[5] 122,906	[5] 2	[5] 114,775	[5] 6	[5] 143,987	[5] 13	[5] 155,653
Ferrovanadium	22	69,279	23	64,713	25	81,016	46	106,754	(3)	(3)

[1] Not separately classified prior to July, 1917.
[2] Not separately classified prior to 1922.
[3] Not separately recorded.
[4] 1,009 pounds.
[5] Includes tungsten wire.

FLUORSPAR

Fluorspar shipped from mines in the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	218,828	$2,287,722	1922	141,596	$2,531,165
1918	263,817	5,465,481	1923	121,188	2.505,819
1919	138,290	3,525,574	1924	124,979	2,451,131
1920	186,778	4,718,547	1925	113,669	2,052,342
1921	34,960	724,094	1926	128,657	2,341,277

Fluorspar shipped from mines in the United States, 1924–1926, by States

State	1924		1925		1926	
	Short tons	Value	Short tons	Value	Short tons	Value
Illinois	62,067	$1,288,310	54,428	$1,024,516	53,734	$1,012,879
Kentucky	47,847	988,940	44,826	833,794	62,494	1,167,129
Colorado	12,301	135,411	11,776	153,707	10,440	161,269
New Mexico	2.580	35,178	2,639	40,325	1,989	
Utah	184	3,292	----------	----------	----------	----------
	124,979	2,451,131	113,669	2,052,342	128,657	2,341,277

Fluorspar imported for consumption in the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	13,616	$114,598	1922	33,108	$299,188
1918	12,572	169,364	1923	41,884	429.696
1919	6,943	107,631	1924	50,821	551,842
1920	24,612	265.630	1925	48,770	469.540
1921	6,229	69,306	1926	75,626	746.479

No exports of fluorspar have been reported by Bureau of Foreign and Domestic Commerce. Producers reported 2,764 tons, valued at $65,475, exported in 1920; 2,296 tons, $40,966, in 1922; 1,144 tons, $25,312, in 1923; 617 tons, $14,489, in 1924; 1,055 tons, $17,574, in 1925; and 2,132 tons, $34,915, in 1926.

FULLER'S EARTH

Fuller's earth sold or used by producers in the United States, 1917–1926

Year	Number of operators	Short tons	Value	Year	Number of operators	Short tons	Value
1917	11	72, 567	$772, 087	1922	15	138, 944	$2, 289, 719
1918	14	84, 468	1, 146, 354	1923	15	149, 134	2, 247, 523
1919	10	106, 145	1, 998, 829	1924	13	177, 994	2, 632, 342
1920	12	128, 487	2, 506, 189	1925	14	206, 574	2, 923, 965
1921	12	105, 609	1, 973, 848	1926	14	234, 152	3, 356, 482

Fuller's earth imported for consumption in the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	16, 994	$176, 417	1922	10, 569	$135, 695
1918	16, 922	226, 235	1923	8, 547	113, 944
1919	13, 873	189, 711	1924	7, 302	92, 488
1920	19, 015	221, 893	1925	8, 015	111, 295
1921	9, 744	119, 415	1926	9, 098	123, 674

Exports of fuller's earth are not reported separately.

GARNET (ABRASIVE)

[See Abrasive materials]

GAS (NATURAL)

Natural gas produced in the United States and delivered to consumers, 1917–1926

[Value at point of consumption]

Year	M cubic feet	Value	Year	M cubic feet	Value
1917	795, 110, 000	$142, 089, 000	1922	762, 546, 000	$221, 535, 000
1918	721, 001, 000	153, 554, 000	1923	1, 006, 976, 000	240, 001, 000
1919	745, 916, 000	160, 888, 000	1924	1, 141, 521, 000	253, 856, 000
1920	798, 210, 000	196, 194, 000	1925	1, 188, 571, 000	265, 271, 000
1921	662, 052, 000	174, 617, 000	1926	1, 313, 019, 000	299, 238, 000

Natural gas produced in the United States and delivered to consumers, 1925–26, by States

[Value at point of consumption]

State	1925		1926	
	M cubic feet	Value	M cubic feet	Value
Arkansas	41, 878, 000	$5, 394, 000	43, 566, 000	$5, 817, 000
California	187, 789, 000	32, 587, 000	204, 915, 000	35, 495, 000
Colorado	574, 400	61, 100	553, 800	130, 000
Illinois	4, 165, 000	865, 000	3, 808, 000	863, 000
Indiana	1, 168, 000	504, 000	901, 000	379, 000
Kansas	26, 917, 000	9, 991, 000	38, 095, 000	12, 547, 700
Kentucky	10, 770, 000	3, 213, 000	10, 410, 000	3, 378, 000
Louisiana	152, 620, 000	8, 125, 000	157, 423, 000	8, 768, 000
Michigan	400	200	400	200
Missouri	34, 000	29, 700	1, 000	700
Montana	1, 496, 000	350, 000	2, 283, 000	450, 000
New Mexico	(1)	(1)	921, 000	75, 000
New York	6, 210, 000	3, 778, 000	7, 027, 000	4, 499, 000
Ohio	43, 235, 000	22, 377, 000	47, 363, 000	25, 403, 000
Oklahoma	249, 285, 000	36, 121, 000	286, 421, 000	42, 140, 000
Pennsylvania	101, 632, 000	47, 098, 000	107, 089, 000	50, 040, 000
South Dakota	4, 200	2, 300	10, 100	14, 000
Tennessee	8, 500	2, 000	11, 500	1, 900
Texas	134, 872, 000	19, 715, 000	175, 392, 000	28, 165, 000
West Virginia	180, 345, 000	70, 903, 000	180, 223, 000	76, 396, 000
Wyoming	45, 539, 000	4, 149, 000	46, 567, 000	4, 669, 000
Other [2]	28, 500	5, 700	38, 200	6, 500
	1, 188, 571, 000	265, 271, 000	1, 313, 019, 000	299, 238, 000

[1] Included under "Other."

[2] 1925: Alaska, Iowa, New Mexico, and North Dakota; 1926: Alaska and North Dakota.

GASOLINE FROM NATURAL GAS

Natural-gas gasoline produced in the United States, 1917–1926

Year	Raw (unblended) gasoline produced		Natural gas treated (estimated) (M cubic feet)
	Gallons	Value at plant	
1917	217, 884, 104	$40, 188, 956	429, 288, 000
1918	282, 535, 550	50, 363, 535	449, 109, 000
1919	351, 535, 026	64, 196, 763	480, 404, 000
1920	384, 743, 922	71, 788, 122	496, 431, 000
1921	449, 934, 402	61, 815, 258	465, 097, 000
1922	505, 832, 000	72, 711, 063	545, 139, 000
1923	816, 226, 000	77, 268, 000	875, 711, 000
1924	933, 861, 000	82, 233, 000	1, 016, 276, 000
1925	1, 127, 470, 000	120, 383, 000	1, 040, 390, 000
1926	1, 363, 090, 000	136, 412, 000	1, 206, 300, 000

Natural-gas gasoline produced in the United States, 1925–26, by States

State	1925		1926	
	Gallons	Value	Gallons	Value
Alaska	33, 000	$5, 000	33, 000	$4, 000
Arkansas	19, 686, 000	2, 420, 000	30, 385, 000	2, 867, 000
California	303, 180, 000	32, 743, 000	389, 366, 000	[1] 45, 945, 000
Colorado	35, 000	4, 000	276, 000	17, 000
Illinois	9, 874, 000	1, 102, 000	9, 987, 000	967, 000
Kansas	19, 592, 000	2, 223, 000	25, 369, 000	2, 105, 000
Kentucky	7, 685, 000	884, 000	7, 689, 000	914, 000
Louisiana	43, 489, 000	4, 216, 000	43, 557, 000	3, 692, 000
New Mexico			1, 488, 000	146, 000
New York	414, 000	46, 000	539, 000	66, 000
Ohio	8, 701, 000	990, 000	10, 817, 000	1, 402, 000
Oklahoma	390, 861, 000	40, 973, 000	475, 716, 000	41, 433, 000
Pennsylvania	18, 850, 000	2, 185, 000	20, 343, 000	2, 454, 000
Texas	214, 092, 000	22, 606, 000	243, 093, 000	22, 760, 000
West Virginia	58, 201, 000	6, 759, 000	63, 807, 000	7, 706, 000
Wyoming	32, 777, 000	3, 227, 000	40, 625, 000	3, 934, 000
	1, 127, 470, 000	120, 383, 000	1, 363, 090, 000	136, 412, 000

[1] Estimate.

GEMS AND PRECIOUS STONES

Value of precious stones produced in the United States, 1917–1923 [1]

Year	Value	Year	Value
1917	$131, 012	1921	[2] $518, 280
1918	106, 523	1922	[2] 71, 106
1919	111, 763	1923 (estimate)	65, 000
1920	265, 205		

[1] Canvass discontinued after 1923.
[2] Production of diamond in Arkansas not reported.

Value of diamonds and other precious stones imported for consumption in the United States, 1917–1926

Year	Diamonds				Other stones not set	Total, excluding pearls	Pearls
	Glazier's	Dust and bort	Rough or uncut	Cut but not set			
1917	$1, 098, 102	$349, 746	$13, 092, 855	$18, 421, 838	$1, 883, 810	$34, 846, 351	$4, 947, 509
1918	718, 397	475, 870	12, 636, 024	7, 734, 150	1, 102, 398	22, 666, 839	765, 929
1919	984, 381	1, 420, 442	20, 306, 758	64, 085, 610	5, 161, 639	91, 958, 830	11, 008, 973
1920	1, 527, 753	3, 387, 488	10, 526, 125	45, 240, 013	5, 419, 363	66, 100, 742	7, 879, 384
1921	435, 872	466, 345	2, 207, 365	26, 144, 323	2, 778, 931	32, 032, 836	4, 492, 063
1922	839, 882	1, 029, 261	8, 332, 416	43, 144, 742	3, 723, 062	57, 069, 363	8, 546, 574
1923	1, 065, 834	228, 409	7, 241, 550	51, 975, 896	5, 703, 279	66, 214, 968	7, 932, 929
1924	1, 116, 862	259, 482	11, 666, 587	47, 108, 169	5, 214, 130	65, 365, 230	5, 898, 560
1925	1, 976, 640	760, 476	9, 492, 328	49, 723, 818	5, 228, 011	67, 181, 273	6, 734, 149
1926	1, 939, 735	271, 382	13, 070, 767	51, 353, 168	6, 333, 779	72, 968, 831	5, 322, 140

Domestic exports in 1922 were as follows: "Diamonds, cut but not set," 15 carats, valued at $1,540; "other precious stones, including pearls," $21,525. Data are not separately classified prior to 1922. For 1923 to 1926, domestic exports are recorded as "Precious stones, including pearls," as follows: 1923, $78,967; 1924, $146,825; 1925, $39,823; 1926, $64,377.

Value of foreign precious stones reexported from the United States, 1917–1926

Year	Diamonds			Other precious stones		Total, excluding pearls	Pearls and parts of, not strung or set
	Uncut	Cut but not set	Bort	Uncut	Cut but not set		
1917	$7,757	$400	$14,962	$1,512	$16,842	$41,473	$20,353
1918			56	100	57	213	42,908
1919	3,238	25,000	(1)	[1] 15,653	1,783	45,674	5,386
1920			(1)	[1] 4,604	13,338	17,942	8,000
1921		896	(1)	[1] 14,390	9,353	24,639	128
1922	19,735	1,396	(1)	[1] 7,387	7,546	36,064	728
1923–1926	(2)	(2)	(2)	(2)	(2)	(2)	(2)

[1] Bort included under "Other precious stones—uncut."

[2] Foreign exports for 1923 to 1925 are recorded as "Diamonds and precious stones," as follows: 1923, 535,840 carats, valued at $27,123; 1924, 47,797 carats, $69,230; 1925, 32,959 carats, $26,983. For 1926 foreign exports are recorded as "Precious stones and imitations," and valued at $57,304.

GOLD AND SILVER [1]

Gold and silver produced in the United States, 1917–1926

Year	Gold		Silver	
	Troy ounces	Value	Troy ounces	Commercial value
1917	4,051,440	$83,750,700	71,740,362	$59,078,100
1918	3,320,784	68,646,700	67,810,139	66,485,129
1919	2,918,628	60,333,400	56,682,445	63,533,652
1920	2,476,166	51,186,900	55,361,573	60,801,955
1921	2,422,006	50,067,300	53,052,441	53,052,441
1922	2,363,075	48,849,100	56,240,048	56,240,048
1923	2,502,632	51,734,000	73,335,170	60,134,839
1924	2,528,900	52,277,000	65,407,186	43,822,814
1925	2,411,987	49,860,200	66,155,424	45,911,864
1926	2,335,042	48,269,600	62,718,746	39,136,497

[1] Gold is valued by law at $20.67+ a troy ounce. For prices of silver, see statement on p. A12.

Gold produced in the United States, 1925–26, by States [1]

State	1925		1926	
	Troy ounces	Value [2]	Troy ounces	Value [2]
Alaska	301,212	$6,226,600	325,186	$6,722,200
Arizona	204,471	4,226,800	232,200	4,800,000
California	641,849	13,268,200	581,700	12,024,800
Colorado	357,036	7,380,600	346,297	7,158,600
Georgia	460	9,500	140	2,900
Idaho	19,974	412,900	12,640	261,300
Montana	84,022	1,736,900	57,707	1,192,900
Nevada	180,352	3,728,200	170,880	3,532,400
New Mexico	29,572	611,300	20,105	415,600
North Carolina	885	18,300	121	2,500
Oregon	18,707	386,700	13,303	275,000
Pennsylvania	121	2,500	106	2,200
Philippine Islands	92,067	1,903,200	96,426	1,993,300
Porto Rico	87	1,800		
South Carolina			15	300
South Dakota	288,160	5,956,800	286,961	5,932,000
Tennessee	358	7,400	416	8,600
Texas	5	100	164	3,400
Utah	181,169	3,745,100	181,832	3,758,800
Virginia	5	100	10	200
Washington	11,465	237,000	8,833	182,600
Wyoming	10	200		
	2,411,987	49,860,200	2,335,042	48,269,600

[1] Figures furnished by the Bureau of the Mint.

[2] Gold value, $20.67+ a troy ounce.

Silver produced in the United States, 1925–26, by States [1]

State	1925		1926	
	Troy ounces	Value [2]	Troy ounces	Value [2]
Alaska	766,096	$531,671	707,454	$441,451
Arizona	7,371,358	5,115,722	7,516,708	4,690,426
Arkansas	2,835	1,968		
California	3,240,400	2,248,838	1,977,956	1,234,244
Colorado	4,434,890	3,077,814	5,037,574	3,143,446
Georgia	47	33	11	7
Idaho	7,663,437	5,318,425	7,563,644	4,719,714
Illinois	3,674	2,550	3,081	1,922
Michigan	135,921	94,329	107,094	66,827
Missouri	44,238	30,701	71,839	44,827
Montana	12,596,609	8,742,047	11,974.257	7,471,936
Nevada	6,846,806	4,751,683	6,450,224	4,024,940
New Mexico	799,673	554,973	496,634	309,900
North Carolina	109	76	22	14
Oregon	35,275	24,481	28,861	18,009
Pennsylvania	1,458	1,012	1,479	923
Philippine Islands	48,502	33,660	45,793	28,575
Porto Rico	195	135		
South Dakota	98,234	68,174	82,789	51,660
Tennessee	104,303	72,386	95,783	59,769
Texas	555,173	385,290	463,611	289,293
Utah	21,240,515	14,740,917	19,936,032	12,440,084
Vermont			1,948	1,216
Virginia	5	3		
Washington	165,565	114,902	155,952	97,314
Wyoming	106	74		
	66,155,424	45,911,864	62,718,746	39,136,497

[1] Figures furnished by the Bureau of the Mint.

[2] Valued at average New York price of bar silver, as follows: 1925, 69.4 cents an ounce; 1926, 62.4 cents an ounce.

Value of gold and silver imported into and exported from the United States, 1917–1926

Year	Gold		Silver	
	Imports	Exports	Imports	Exports
1917	$552,454,374	$371,883,884	$53,340,477	$84,130,876
1918	62,042,748	41,069,818	71,375,699	252,846,464
1919	76,534,046	368,185,248	89,410,018	239,021,051
1920	417,068,273	322,091,208	88,060,041	113,616,224
1921	691,248,297	23,891,377	63,242,671	51,575,399
1922	275,169,785	36,874,894	70,806,653	62,807,286
1923	322,715,812	28,643,417	74,453,530	72,468,789
1924	319,720,918	61,648,313	73,944,902	109,891,033
1925	128,273,172	262,639,790	64,595,418	99,127,585
1926	213,504,020	115,707,815	69,595,936	92,257,564

Value of gold and silver imported into and exported from the United States, 1925–26, by classes

	Imports	Exports	Excess of—	
			Imports	Exports
1925				
Gold:				
Contained in domestic ore and base bullion		$144, 480		$144, 480
Contained in foreign ore and base bullion	$16, 205, 097		$16, 205, 097	
Domestic bullion refined	5, 041, 364	105, 995, 453		100, 954, 089
Foreign bullion refined	91, 893, 425	360	91, 893, 065	
United States coin	11, 210, 631	156, 123, 273		144, 912, 642
Foreign coin	3, 922, 655	376, 224	3, 546, 431	
	128, 273, 172	262, 639, 790	111, 644, 593	246, 011, 211
Excess exports over imports				134, 366, 618
Silver:				
Contained in domestic ore and base bullion		33, 250		33, 250
Contained in foreign ore and base bullion	33, 134, 911		33, 134, 911	
Domestic bullion refined		81, 451, 173		81, 451, 173
Foreign bullion refined	29, 899, 214	13, 157, 833	16, 741, 381	
United States coin	999, 100	318, 235	680, 865	
Foreign coin	562, 193	4, 167, 094		3, 604, 901
	64, 595, 418	99, 127, 585	50, 557, 157	85, 089, 324
Excess exports over imports				34, 532, 167
1926				
Gold:				
Contained in domestic ore and base bullion		207, 725		207, 725
Contained in foreign ore and base bullion	20, 872, 276		20, 872, 276	
Domestic bullion refined	874, 633	9, 536, 867		8, 662, 234
Foreign bullion refined	71, 130, 166	1, 281	71, 128, 885	
United States coin	53, 971, 385	104, 349, 771		50, 378, 386
Foreign coin	66, 655, 560	1, 612, 171	65, 043, 389	
	213, 504, 020	115, 707, 815	157, 044, 550	59, 248, 345
Excess imports over exports			97, 796, 205	
Silver:				
Contained in domestic ore and base bullion		53, 573		53, 573
Contained in foreign ore and base bullion	46, 170, 162	381	46, 169, 781	
Domestic bullion refined		73, 961, 544		73, 961, 544
Foreign bullion refined	21, 098, 685	14, 581, 915	6, 516, 770	
United States coin	1, 559, 943	542, 470	1, 017, 473	
Foreign coin	767, 146	3, 117, 681		2, 350, 535
	69, 595, 936	92, 257, 564	53, 704, 024	76, 365, 652
Excess exports over imports				22, 661, 628

GRAPHITE

Natural graphite sold or used by producers in the United States, 1917–1926

Year	Amorphous		Crystalline	
	Short tons	Value	Pounds	Value
1917	8, 301	$73, 481	10, 584, 080	$1, 094, 398
1918	6, 560	69, 455	12, 861, 839	1, 454, 799
1919	3, 379	47, 716	8, 086, 191	731, 141
1920	4, 694	49, 758	9, 632, 360	576, 444
1921	1, 842	20, 860	1, 189, 523	75, 664
1922	2, 200	(1)	1, 849, 766	85, 242
1923	4, 056	39, 560	3, 964, 900	151, 434
1924	4, 071	38, 533	1, 800, 325	48, 977
1925	3, 536	39, 640	2, 257, 250	56, 721
1926	2, 975	40, 500	4, 989, 200	178, 842

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[1] Bureau of Mines not at liberty to publish value.

Graphite is manufactured by the Acheson Graphite Co. at Niagara Falls, N. Y. The figures given below are published by permission of this company.

Graphite manufactured by the Acheson Graphite Co., 1917–1926, in pounds

1917	10, 474, 649	1922	13, 031, 926
1918	9, 182, 272	1923	26, 761, 015
1919	8, 163, 177	1924	10, 986, 192
1920	7, 399, 749	1925	12, 135, 655
1921	5, 888, 000	1926	21, 163, 986

Graphite imported into and exported from the United States, 1917–1926

Year	Imports for consumption		Exports		
	Short tons	Value	Unmanufactured		Manufactures of
			Short tons	Value	
1917	42, 577	$8, 961, 988	2, 573	$349, 563	$891, 687
1918	19, 498	3, 092, 475	954	121, 555	731, 518
1919	26, 626	2, 978, 096	629	90, 185	788, 755
1920	21, 095	1, 711, 312	607	112, 771	610, 261
1921	8, 183	452, 076	921	95, 998	679, 359
1922	12, 488	473, 046	569	78, 094	[1] 255, 019
1923	[2] 19, 434	[2] 614, 119	908	138, 542	[1] 335, 778
1924	[2] 16, 375	[2] 399, 511	1, 022	144, 108	[1] 250, 957
1925 [3]	[2] 17, 768	[2] 826, 410	945	142, 122	[1] 337, 481
1926 [3]	[2] 16, 166	[2] 921, 233	405	49, 235	[1] 463, 084

[1] Exclusive of crucibles, figures for which are not available.

[2] Composed of the following: 1923, "amorphous,"11,252 tons, $149,831; "crystalline lump, chip, or dust," 7,243 tons, $426,417; and "crystalline flake," 939 tons, $37,871; 1924, 10,936 tons, $113,751; 3,998 tons, $197,867; and 1,441 tons, $87,893; 1925, 9,210 tons, $143,750; 5,904 tons, $389,242; and 2,654 tons, $293,418; and 1926, 8,250 tons, $161,564; 5,258 tons, $433,848; and 2,658 tons, $325,821, respectively. Classes not separately shown for earlier years.

[3] Imports of graphite crucibles were not separately classified until 1925 when 3,100 crucibles, valued at $548, were imported. Corresponding imports for 1926 were 9,513 crucibles, $11,780. Weight not recorded.

GRINDSTONES AND PULPSTONES

[See Abrasive materials]

GYPSUM

Gypsum produced in the United States and sold by producers, 1917–1926

Year	Crude produced (short tons)	Crude and calcined sold (total value)	Year	Crude produced (short tons)	Crude and calcined sold (total value)
1917	2, 696, 226	$11, 116, 452	1922	3, 779, 949	$29, 361, 151
1918	2, 057, 015	11, 470, 854	1923	4, 753, 448	34, 888, 155
1919	2, 420, 163	15, 727, 907	1924	5, 042, 629	42, 724, 507
1920	3, 129, 142	24, 533, 065	1925	5, 678, 302	47, 577, 240
1921	2, 890, 784	23, 700, 290	1926	5, 635, 441	46, 721, 219

Gypsum imported for consumption in the United States, 1917–1926

Year	Crude		Ground or calcined		Value of manufactured plaster of Paris	Keenes cement		Total value
	Short tons	Value	Short tons	Value		Short tons	Value	
1917	240, 269	$265, 504	16, 533	$109, 732	$6, 016	484	$8, 003	$389, 255
1918	50, 653	55, 004	6, 117	70, 028	1, 765	111	2, 259	129, 056
1919	171, 733	211, 946	10, 415	126, 405	7, 719	187	5, 984	352, 054
1920	282, 486	397, 942	14, 921	179, 191	10, 282	202	5, 338	592, 753
1921	266, 796	364, 318	4, 495	55, 109	33, 072	184	6, 836	459, 335
1922	409, 475	523, 939	1, 774	32, 651	55, 116	403	9, 636	621, 342
1923	448, 129	629, 203	5, 133	77, 716	41, 317	418	11, 543	759, 779
1924	519, 627	724, 864	5, 217	70, 793	48, 059	539	12, 042	855, 758
1925	634, 423	915, 888	10, 759	140, 941	56, 724	449	11, 294	1, 124, 847
1926	824, 081	1, 276, 131	7, 149	99, 058	96, 355	578	15, 701	1, 487, 245

Exports of gypsum are designated as "gypsum or plaster, crude, ground, calcined, and manufactures of," and have been as follows: 1926, 19,610 short tons, valued at $576,585; 1925, 16,798 tons, $498,616; 1924, 10,623 tons, $358,425; 1923, 8,815 tons, $226,423; 1922, 7,673 tons, $178,166. Exports are not separately classified for earlier years.

ILMENITE

[See Titanium minerals]

IRON ORE, PIG IRON, AND STEEL

IRON ORE

[Exclusive of all domestic ore containing 5 per cent or more of manganese. For data regarding such ore, see Manganese]

Iron ore mined in the United States, 1917–1926, by varieties, in long tons

Year	Hematite	Brown ore	Magnetite	Carbonate	Total
1917	70, 743, 513	1, 992, 332	2, 553, 006		75, 288, 851
1918	65, 894, 709	1, 613, 844	2, 149, 725		69, 658, 278
1919	[1] 57, 719, 582	1, 127, 397	[1] 2, 118, 439		60, 965, 418
1920	[1][2] 63, 883, 523	[2] 1, 325, 661	[1] 2, 391, 541	3, 740	67, 604, 465
1921	[1][2] 28, 337, 249	[2] 370, 154	[1] 780, 866	2, 709	29, 490, 978
1922	[2] 44, 888, 723	[2] 783, 582	1, 452, 966	3, 256	47, 128, 527
1923	[2] 65, 924, 454	[2] 1, 232, 848	2, 190, 624	3, 516	69, 351, 442
1924	[2] 52, 102, 300	[2] 814, 159	1, 347, 711	3, 249	54, 267, 419
1925	[2] 59, 546, 690	[2] 884, 600	1, 472, 004	4, 703	61, 907, 997
1926	[2][3] 64, 634, 573	[2] 810, 924	[3] 2, 175, 288	2, 215	67, 623, 000

[1] Some magnetite included with hematite.
[2] Some hematite included with brown ore.
[3] Some hematite included with magnetite.

Iron ore mined in the United States, 1925–26, by mining districts and varieties in long tons

District	Hematite	Brown ore	Magnetite	Carbonate	Total
1925					
Lake Superior [1]	52,056,663				52,056,663
Birmingham	6,312,207	323,599			6,635,806
Chattanooga	259,843	96,877			356,720
Adirondack Northern New Jersey and southeastern New York			328,745		328,745
Other districts	[2] 917,977	[2] 464,124	1,143,259	4,703	2,530,063
	[2] 59,546,690	[2] 884,600	1,472,004	4,703	61,907,997
1926					
Lake Superior [1]	57,143,407				57,143,407
Birmingham	6,114,917	393,300			6,508,217
Chattanooga	198,574	68,550			267,124
Adirondack Northern New Jersey and southeastern New York			[3] 847,966		[3] 847,966
Other districts	[2] [3] 1,177,675	[2] 349,074	1,327,322	2,215	[3] 2,856,286
	[2] [3] 64,634,573	[2] 810,924	[3] 2,175,288	2,215	67,623,000

[1] Includes only those mines in Wisconsin which are in the true Lake Superior district.
[2] Some hematite included with brown ore.
[3] Some hematite from "Other districts" included with magnetite from Adirondack district.

Iron ore mined in the Lake Superior district, 1917–1926, by ranges, in long tons

Year	Marquette	Menominee	Gogebic	Vermilion	Mesabi	Cuyuna	Total
1917	4,638,374	6,366,483	7,881,232	1,481,301	41,127,323	1,986,608	63,481,321
1918	3,946,554	6,041,637	7,837,634	1,192,677	39,055,977	1,705,315	59,779,794
1919	4,158,751	4,863,968	7,368,994	1,051,795	33,262,954	1,685,877	52,392,339
1920	4,457,609	5,651,542	8,298,206	1,053,518	36,641,880	1,757,775	57,860,530
1921	2,204,114	2,147,569	3,135,477	981,576	16,380,190	449,559	25,298,485
1922	2,745,626	3,290,641	4,910,789	1,108,764	26,704,601	955,595	39,716,016
1923	3,910,909	4,913,541	6,112,662	1,119,113	41,809,018	1,420,165	59,285,408
1924	3,579,087	3,780,664	5,579,883	1,141,690	29,818,965	941,430	44,841,719
1925	3,813,687	5,009,022	6,377,710	1,331,753	34,851,109	673,382	52,056,663
1926	4,046,191	5,445,683	6,949,920	1,568,953	37,997,797	1,134,863	57,143,407

Iron ore shipped from mines in the United States, 1917–1926

[Exclusive of ore sold for paint. See p. A67]

Year	Long tons	Value	Year	Long tons	Value
1917	75,573,207	$238,260,444	1922	50,612,620	$157,809,286
1918	72,021,202	244,368,147	1923	69,811,472	240,738,921
1919	56,372,784	197,312,517	1924	52,083,375	151,307,105
1920	69,281,341	285,006,327	1925	63,924,763	160,796,886
1921	26,652,528	89,745,308	1926	69,292,832	174,015,645

Iron ore shipped from mines in the United States, 1925–26, by States

[Exclusive of ore sold for paint. See p. A67]

State	1925		1926	
	Long tons	Value	Long tons	Value
Alabama	6, 891, 081	$14, 134, 677	6, 871, 412	$13, 846, 656
California	352	(1)	282	(1)
Colorado	8, 642	(1)	35, 535	(1)
Georgia	79, 488	231, 683	51, 642	149, 198
Michigan	15, 254, 003	40, 926, 315	16, 699, 984	43, 932, 982
Minnesota	38, 022, 237	96, 083, 485	40, 961, 361	103, 715, 621
Missouri	40, 043	(1)	124, 371	532, 536
Montana	3, 672	10, 244	724	1, 810
New Jersey	164, 523	678, 021	212, 152	925, 403
New Mexico	172, 959	(1)	216, 269	(1)
New York	413, 517	1, 988, 735	659, 741	3, 015, 586
North Carolina	22, 011	49, 511	14, 798	31, 645
Ohio	2, 410	(1)		
Pennsylvania	917, 255	2, 149, 800	1, 088, 634	2, 483, 056
Tennessee	164, 073	369, 144	138, 307	312, 109
Utah	268, 529	361, 251	296, 943	411, 611
Virginia	76, 302	174, 454	49, 703	162, 446
Washington	830	(1)	1, 702	(1)
Wisconsin	933, 214	2, 260, 388	1, 238, 885	3, 178, 156
Wyoming	489, 622	(1)	630, 387	(1)
Undistributed		[2] 1, 379, 178		[2] 1, 316, 830
	63, 924, 763	160, 796, 886	69, 292, 832	174, 015, 645

[1] Included under "Undistributed."
[2] This figure covers States entered as "(1)" above.

Stocks of iron ore at mines in the United States, December 31, 1917–1926, in long tons

1917	11, 003, 843	1922	10, 524, 279
1918	8, 565, 893	1923	10, 165, 875
1919	13, 097, 500	1924	12, 410, 619
1920	11, 378, 794	1925	10, 795, 630
1921	13, 836, 267	1926	9, 565, 880

Stocks of iron ore at mines in the United States, December 31, 1925 and 1926, in long tons

State	1925	1926	State	1925	1926
Alabama	942, 448	912, 702	Pennsylvania	37, 607	42, 263
Iowa	12, 165	12, 165	Utah	1, 934	
Michigan	6, 769, 006	5, 527, 102	Virginia	26, 473	25, 929
Minnesota	2, 645, 543	2, 505, 982	Wisconsin	54, 075	175, 629
Missouri	2, 629	2, 629			
New Jersey	149, 974	146, 957		10, 795, 630	9, 565, 880
New York	153, 776	214, 522			

Iron ore imported into and exported from the United States, 1917–1926

Year	Imports		Exports	
	Long tons	Value	Long tons	Value
1917	971, 663	$3, 655, 392	1, 132, 313	$4, 464, 111
1918	787, 468	3, 464, 304	1, 256, 383	5, 535, 090
1919	476, 461	2, 385, 689	996, 569	4, 308, 746
1920	1, 273, 456	4, 963, 654	1, 145, 037	6, 198, 927
1921	315, 768	1, 075, 909	440, 106	2, 077, 620
1922	1, 135, 156	4, 916, 294	602, 194	2, 770, 878
1923	2, 768, 430	11, 308, 503	1, 116, 932	5, 305, 365
1924	2, 047, 055	10, 580, 904	595, 413	2, 407, 003
1925	2, 190, 697	6, 895, 229	630, 521	2, 411, 093
1926	2, 555, 441	5, 876, 316	868, 710	3, 380, 701

PIG IRON

Pig iron shipped from blast furnaces in the United States, 1917–1926

Year	Long tons	Value	Year	Long tons	Value
1917	38, 612, 546	$1, 053, 785, 975	1922	27, 670, 738	$608, 144, 858
1918	38, 230, 440	1, 180, 759, 565	1923	38, 361, 379	946, 799, 378
1919	30, 130, 231	775, 915, 043	1924	31, 064, 129	665, 078, 972
1920	35, 710, 227	1, 140, 904, 096	1925	36, 814, 702	739, 316, 333
1921	16, 038, 619	389, 437, 792	1926	38, 181, 053	749, 633, 468

Pig iron shipped from blast furnaces in the United States, 1925–26, by States

State	1925		1926	
	Long tons	Value	Long tons	Value
Alabama	2, 910, 370	$57, 777, 275	2, 875, 534	$58, 119, 260
Colorado	(1)	(1)	(1)	(1)
Illinois	3, 600, 484	74, 937, 781	3, 626, 330	73, 460, 392
Indiana	3, 350, 747	64, 807, 575	3, 670, 478	69, 292, 329
Kentucky	153, 935	(1)	148, 053	(1)
Maryland	693, 523	(1)	791, 637	(1)
Massachusetts	------------	------------	23, 130	(1)
Michigan	831, 435	18, 452, 346	638, 282	13, 180, 113
Minnesota	276, 240	(1)	292, 658	(1)
Missouri	3, 758	(1)	------------	------------
New Jersey	(1)	(1)	(1)	(1)
New York	2, 151, 036	40, 435, 443	2, 389, 665	44, 970, 196
Ohio	8, 857, 615	173, 418, 068	9, 177, 127	176, 433, 401
Pennsylvania	12, 537, 809	258, 140, 674	13, 142, 528	263, 238, 184
Tennessee	95, 186	2, 014, 176	113, 029	2, 544, 825
Utah	126, 746	(1)	(1)	(1)
Virginia	97, 884	2, 237, 749	105, 019	2, 322, 451
West Virginia	499, 047	9, 416, 095	364, 302	(1)
Wisconsin	226, 712	4, 836, 952	235, 597	5, 034, 012
Undistributed	[2] 402, 175	[2] 32, 842, 199	[2] 587, 684	[2] 41, 038, 305
	36, 814, 702	739, 316, 333	38, 181, 053	749, 633, 468

[1] Included under "Undistributed."
[2] This figure covers States entered as "(1)" above.

Pig iron [1] imported into and exported from the United States, 1917–1926

Year	Imports		Exports	
	Long tons	Value	Long tons	Value
1917 [1]	76, 786	$7, 872, 105	656, 220	$24, 037, 051
1918 [1]	34, 711	4, 968, 056	269, 575	11, 576, 721
1919 [1]	101, 665	6, 565, 106	321, 261	12, 313, 183
1920 [1]	185, 944	12, 801, 834	216, 828	10, 074, 377
1921 [1]	44, 036	2, 014, 926	28, 307	933, 093
1922	383, 445	8, 670, 860	30, 920	756, 842
1923	367, 778	9, 005, 077	32, 318	862, 443
1924	209, 109	3, 741, 213	41, 483	957, 921
1925	441, 425	7, 951, 283	32, 674	724, 565
1926	445, 773	7, 708, 982	25, 208	523, 883

[1] Figures for 1917 to 1921 include ferro-alloys. Separate data not available prior to 1922.

STEEL

Steel produced in the United States, 1917–1926, in long tons [1]

Year	Bessemer	Open-hearth	Crucible	Other steel	Total
1917	10, 479, 960	34, 148, 893	126, 716	305, 038	45, 060, 607
1918	9, 376, 236	34, 459, 391	115, 112	511, 693	44, 462, 432
1919	7, 271, 562	26, 948, 694	63, 572	387, 404	34, 671, 232
1920	8, 883, 087	32, 671, 895	72, 265	505, 687	42, 132, 934
1921	4, 015, 938	15, 589, 802	7, 613	170, 444	19, 783, 797
1922	5, 919, 298	29, 308, 983	28, 606	346, 039	35, 602, 926
1923	8, 484, 088	35, 899, 657	44, 079	515, 872	44, 943, 696
1924	5, 899, 590	31, 577, 350	22, 473	432, 526	37, 931, 939
1925	6, 723, 962	38, 034, 488	19, 562	615, 512	45, 393, 524
1926	6, 934, 568	40, 691, 979	15, 493	651, 723	48, 293, 763

[1] According to the American Iron and Steel Institute.

LEAD [1]

Refined primary lead produced in the United States from domestic ores, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	548, 450	$94, 333, 000	1922	468, 746	$51, 562, 000
1918	539, 905	76, 667, 000	1923	543, 841	76, 138, 000
1919	424, 433	44, 990, 000	1924	566, 407	90, 625, 000
1920	476, 849	76, 296, 000	1925	654, 921	113, 956, 000
1921	398, 222	35, 840, 000	1926	680, 685	108, 910, 000

[1] For prices of lead, see statement on p. A12.

Refined primary lead produced in the United States, 1922–1926, in short tons

	1922	1923	1924	1925	1926
Domestic ore:					
Desilverized lead	185, 191	291, 760	299, 343	345, 429	366, 413
Soft lead	209, 250	190, 749	203, 615	260, 560	258, 565
Desilverized soft lead	74, 305	61, 332	63, 449	48, 932	55, 707
Total from domestic ore	468, 746	543, 841	566, 407	654, 921	680, 685
Foreign ore:					
Africa	----------	99	6	----------	6
Canada	3, 604	3, 632	4, 633	10, 676	5, 385
Central America	14	18	30	6	----------
Mexico	7, 260	18, 867	33, 328	31, 107	32, 693
South America	2, 458	1, 461	7, 663	4, 496	9, 893
Other foreign	562	211	725	739	233
Foreign base bullion:					
Canada	2, 900	----------	----------	----------	----------
Mexico	47, 118	50, 193	77, 701	65, 024	70, 046
Total from foreign ore and base bullion	63, 916	74, 481	124, 086	112, 048	118, 256
Grand total from all sources	532, 662	618, 322	690, 493	766, 969	798, 941
Production of antimonial lead	8, 075	14, 190	20, 787	19, 667	22, 524

Secondary lead recovered in the United States, 1917–1926

Year	Pig lead (short tons)	Lead in alloys (short tons)	Total	
			Short tons	Value
1917	45,100	48,400	93,500	$16,082,000
1918	41,146	55,954	97,100	13,788,000
1919	55,684	66,416	122,100	12,943,000
1920	56,350	68,300	124,650	19,944,000
1921	46,370	57,410	103,780	9,340,000
1922	75,480	84,080	159,560	17,552,000
1923	96,430	98,060	194,490	27,229,000
1924	90,400	114,100	204,500	32,720,000
1925	112,420	114,460	226,880	39,477,100
1926	125,000	152,300	277,300	44,368,000

Lead imported for consumption in the United States, 1917–1926, by classes

Year	Lead in ore [1]		Base bullion		Pigs, bars, and old [2]		Sheets, pipe, and shot		Not otherwise specified (value)	Total value
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value		
1917	5,438,931	$207,370	6,965,849	$470,539	1,756,223	$85,743	12,538	$2,699	$10,287	$776,638
1918	6,064,902	344,080	3,559,071	180,070	1,139,950	56,694	6,892	624	36,723	618,191
1919	4,106,823	196,363	31,796,693	1,130,937	10,174,115	415,094	8,018	628	17,187	1,760,209
1920	13,700,499	908,619	66,816,820	3,340,600	68,901,959	3,887,821	81,396	5,483	21,328	8,163,851
1921	6,842,807	327,046	56,819,980	1,668,410	61,909,094	1,972,716	3,087	140	11,204	3,979,516
1922	23,649,851	812,603	55,859,422	1,815,142	8,563,110	335,924	6,018	697	12,286	2,976,652
1923	22,420,046	1,190,414	11,124,151	626,201	42,925,265	2,510,466	19,525	4,495	90,027	4,421,603
1924	65,147,976	3,145,791	28,796,402	1,542,167	27,362,392	1,850,862	11,666	4,384	138,637	6,681,841
1925	12,706,508	672,112	24,747,665	1,823,566	15,464,205	1,038,350	27,579	10,429	139,533	3,683,990
1926	58,752,911	3,393,039	13,341,038	972,758	24,365,570	2,191,658	864,342	101,322	62,895	6,721,672

[1] Includes also lead in matte beginning Sept 22, 1922, when change in tariff went into effect.

[2] Includes also imports of antimonial lead, antimonial scrap lead, babbitt metal, solder, etc., beginning Sept. 22, 1922, when change in tariff went into effect, except in 1925 and 1926, when antimonial lead is excluded.

Lead imported into the United States in ore, base bullion, and refined, by sources, 1922–1926, in pounds

[General imports]

Year	Canada	Mexico	South America	Europe	Other countries	Total
1922	8,663,236	141,216,136	3,803,478	1,454,384	513,335	155,650,569
1923	11,399,671	242,352,788	5,300,161	11,004,938	520,635	270,578,193
1924	11,022,091	243,161,069	15,820,867	4,857,805	453,432	275,315,264
1925	11,646,820	218,873,800	10,621,737	1,594,963	1,521,110	244,258,430
1926	12,316,740	254,203,852	24,790,075	3,224,504	572,856	295,108,027

Lead imported into the United States, by classes, 1922–1926, in pounds

[General imports]

Year	Lead in ore (lead content)	Base bullion (lead content)	Pigs, bars, sheets, and old	Total lead content
1922	24,474,481	124,074,465	7,101,623	155,650,569
1923	66,882,850	161,496,495	42,198,848	270,578,193
1924	95,320,168	155,501,350	24,493,746	275,315,264
1925	88,962,502	141,253,559	14,042,369	244,258,430
1926	116,232,669	156,570,738	22,304,620	295,108,027

Lead exported from the United States, 1917–1926, by classes

Year	Pigs and bars				Foreign lead used in articles exported with benefit of drawback[1]	Manufactures of lead from both domestic and foreign ores
	From domestic ore		From foreign ore			
	Pounds	Value	Pounds	Value	Pounds	
1917	107, 376, 638	$9, 560, 598	75, 304, 480	$6, 650, 157	15, 074, 947	$2, 288, 205
1918	83, 662, 322	5, 889, 381	118, 832, 344	8, 309, 798	6, 852, 173	1, 828, 473
1919	21, 019, 605	1, 471, 256	81, 951, 396	4, 536, 273	3, 872, 130	2, 155, 436
1920	5, 459, 713	462, 223	34, 725, 501	2, 570, 535	12, 350, 794	3, 621, 397
1921	3, 247, 294	177, 926	50, 000, 259	2, 284, 107	18, 738, 927	1, 376, 259
1922	11, 645, 821	604, 605	64, 709, 305	3, 177, 360	11, 354, 070	1, 158, 150
1923	3, 997, 485	260, 487	97, 471, 326	5, 195, 256	25, 052, 107	1, 078, 636
1924	10, 664, 083	711, 147	153, 515, 863	9, 685, 619	30, 549, 116	1, 965, 555
1925	9, 910, 955	784, 440	197, 128, 517	14, 910, 891	23, 398, 305	2, 006, 309
1926	8, 551, 639	601, 061	135, 319, 321	8, 904, 603	35, 910, 934	3, 297, 704

[1] Exclusive of lead that entered as pig and was exported in the same form, which would be duplicated in exports of lead from foreign ore.

LIME

Lime sold by producers in the United States, 1917–1926

Year	Hydrated			Total		
	Number of plants in operation	Short tons	Value[1]	Number of plants in operation	Short tons	Value[1]
1917	90	709, 157	$4, 643, 004	595	3, 786, 364	$23, 807, 877
1918	90	620, 216	5, 342, 113	496	3, 206, 016	26, 808, 909
1919	93	777, 408	7, 061, 146	539	3, 330, 347	29, 448, 553
1920	98	853, 116	9, 287, 562	515	3, 570, 141	37, 543, 840
1921	105	792, 970	7, 421, 637	520	2, 532, 153	24, 895, 370
1922	114	1, 106, 063	9, 868, 980	530	3, 639, 617	33, 255, 039
1923	121	1, 225, 928	12, 229, 598	467	4, 076, 243	39, 993, 652
1924	120	1, 316, 664	13, 199, 846	450	4, 072, 000	39, 596, 423
1925	134	1, 560, 848	15, 287, 461	450	4, 580, 823	42, 609, 141
1926	147	1, 606, 811	15, 182, 460	435	4, 560, 398	41, 566, 452

[1] The value given represents the value of bulk lime f. o. b. at point of shipment and does not include cost of barrel or package.

Lime sold by producers in the United States, 1925–26, by States

State	1925			1926		
	Number of plants in operation	Short tons	Value	Number of plants in operation	Short tons	Value
Alabama	11	207,699	$1,679,155	11	220,732	$1,721,558
Arizona	3	39,045	394,023	3	42,757	421,549
Arkansas	5	24,791	223,965	5	31,346	275,935
California	10	70,805	745,132	9	67,421	800,089
Colorado	3	(1)	(1)	4	12,470	127,975
Connecticut	6	58,449	672,821	6	61,742	695,495
Florida	3	17,793	186,650	4	9,424	100,241
Georgia	1	(1)	(1)	1	18,526	141,257
Hawaii	1	(1)	(1)	1	5,717	102,063
Idaho	1	(1)	(1)	2	(1)	(1)
Illinois	10	96,066	928,632	12	103,180	1,013,740
Indiana	7	127,878	1,067,040	7	126,005	970,624
Iowa	2	(1)	(1)	2	(1)	(1)
Kentucky	3	9,433	71,300	3	8,550	55,663
Louisiana				1	(1)	(1)
Maine	4	115,571	1,291,812	4	128,120	1,615,776
Maryland	12	64,518	524,100	10	63,639	524,242
Massachusetts	9	197,732	2,610,279	10	202,065	2,653,746
Michigan	8	95,036	909,952	8	107,671	995,123
Minnesota	3	(1)	(1)	4	28,522	296,068
Missouri	18	273,348	2,610,954	15	263,467	2,218,943
Montana	3	6,269	44,992	3	8,099	64,916
Nevada	1	(1)	(1)	1	23,162	239,469
New Jersey	2	(1)	(1)	1	(1)	(1)
New Mexico	3	1,329	14,010	3	2,032	20,479
New York	12	104,829	1,030,960	12	107,326	1,016,647
North Carolina	1	(1)	(1)	2	(1)	(1)
Ohio	33	1,089,385	10,970,605	31	1,056,589	10,348,880
Oklahoma	2	(1)	(1)	1	257	2,185
Oregon	1	(1)	(1)	2	785	13,930
Pennsylvania	142	794,951	6,425,675	133	794,196	6,303,312
Porto Rico	18	9,988	148,326	14	7,116	130,872
Rhode Island	1	(1)	(1)	1	2,857	42,535
South Dakota	2	(1)	(1)	2	(1)	(1)
Tennessee	14	175,685	1,344,508	13	173,363	1,319,303
Texas	6	74,638	698,138	6	78,293	706,153
Utah	9	22,062	265,060	10	29,953	348,509
Vermont	10	66,245	788,936	10	56,378	677,944
Virginia	30	192,429	1,491,568	31	188,696	1,453,095
Washington	6	29,636	357,297	4	23,783	298,014
West Virginia	9	270,895	1,879,223	9	267,464	1,719,590
Wisconsin	25	244,903	2,201,504	23	216,414	1,896,772
Wyoming				1	(1)	(1)
Undistributed		99,415	1,029,524		22,281	233,760
	450	4,580,823	42,609,141	435	4,560,398	41,566,452

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[1] Included under "Undistributed."

Lime imported into and exported from the United States, 1917–1926

Year	Imports for consumption		Exports	
	Short tons	Value	Short tons	Value
1917	7,353	$70,505	18,794	$168,671
1918	6,650	73,458	7,191	105,803
1919	8,679	128,519	6,372	108,370
1920	22,688	392,137	5,921	128,296
1921	10,811	234,798	5,192	109,769
1922	14,112	290,845	8,289	116,649
1923	25,407	428,903	11,789	170,289
1924	20,480	377,994	14,905	212,340
1925	15,323	285,599	14,800	218,696
1926	18,702	346,969	12,960	191,768

LITHIUM MINERALS

Lithium minerals produced in the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	2, 062	$42, 912	1922	2, 192	$41, 300
1918	5, 894	111, 600	1923	2, 310	38, 800
1919	6, 287	115, 000	1924	2, 996	62, 391
1920	11, 696	173, 002	1925	3, 140	58, 500
1921	1, 833	33, 508	1926	3, 700	53, 400

Imports and exports of lithium minerals are not reported separately.

LITHOGRAPHIC STONE

Production of lithographic stone in the United States in 1917 and 1918 was as follows: 1917, 5,832 pounds, valued at $489; 1918, 6,000 pounds, $350. No domestic production has been reported since 1918.

Lithographic stone imported for consumption in the United States, 1917–1926

Year	Pounds	Value	Year	Pounds	Value
1917			1922	256, 426	$28, 242
1918			1923	225, 600	24, 861
1919	464, 914	$216, 293	1924	133, 674	9, 046
1920	786, 119	63, 733	1925	186, 971	20, 263
1921	301, 546	34, 101	1926	248, 698	28, 201

No exports of lithographic stone are reported.

MAGNESITE

Domestic magnesite (expressed as equivalent crude) sold or treated in the United States, 1917–1926

Year	California		Washington		Total	
	Short tons	Value	Short tons	Value	Short tons	Value
1917	211, 663	$2, 116, 630	105, 175	$783, 188	316, 838	$2, 899, 818
1918	84, 077	761, 811	147, 528	1, 050, 790	231, 605	1, 812, 601
1919	50, 020	504, 973	106, 206	743, 442	156, 226	1, 248, 415
1920	81, 782	1, 083, 262	221, 985	1, 664, 888	303, 767	2, 748, 150
1921	47, 904	510, 177			47, 904	510, 177
1922	[1]55, 790	[1] 571, 745	(1)	(1)	55, 790	571, 745
1923	73, 350	938, 600	73, 900	165, 100	147, 250	1, 103, 700
1924	67, 240	901, 700	52, 860	139, 600	120, 100	1, 041, 300
1925	64, 600	872, 100	56, 060	560, 600	120, 660	1, 432, 700
1926	53, 940	604, 130	79, 560	596, 700	133, 500	1, 200, 830

[1] Washington included with California. Bureau of Mines not at liberty to publish figures.

Magnesite imported for consumption in the United States, 1917–1926

Year	Crude		Calcined, not purified	
	Short tons	Value	Short tons	Value
1917	30,277	$232,105	3,966	$232,601
1918	5,432	103,233	19,049	824,022
1919	6,381	103,311	9,471	270,721
1920	33,550	406,204	14,780	373,165
1921	51,993	525,452	6,788	250,932
1922	73,331	976,283	72,265	1,267,622
1923	5,182	44,081	72,955	1,022,968
1924	6	85	64,785	1,172,403
1925	487	6,382	68,395	1,160,830
1926	608	6,555	90,293	1,438,765

Exports are not separately recorded.

MAGNESIUM

Domestic metallic magnesium sold or used in the United States, 1917–1926

Year	Number of producers	Pounds	Value
1917	5	115,813	$233,626
1918	4	284,118	615,217
1919	3	127,465	247,302
1920	2	(2)	(2)
1921	1	48,000	86,000
1922	2	[1] 60,000	[1] $89,000
1923	2	[1] 125,000	[1] 155,000
1924	2	[1] 128,000	[1] 150,000
1925	2	245,000	274,400
1926	2	322,650	390,400

[1] Estimate.
[2] Bureau of Mines not at liberty to publish figures.

Magnesium imported for consumption in the United States, 1918–1926

Year	Pounds	Value
1918—July to December [1]	11,899	$16,259
1919	13,239	13,583
1920	29,275	25,055
1921	39,913	30,592
1922	182,939	54,448
1923	13,974	$11,576
1924	8,738	6,561
1925	8,326	7,070
1926	10,117	4,750

[1] Not separately recorded prior to July, 1918.

Exports are not separately recorded.

MANGANESE

Manganese and manganiferous ore (exclusive of fluxing ore) shipped from mines in the United States, 1917–1926

Year	Ore containing 35 per cent of manganese or more			Ore containing 10 to 35 per cent of manganese			Ore containing 5 to 10 per cent of manganese		
	Number of shippers	Long tons	Value	Number of shippers	Long tons	Value	Number of shippers	Long tons	Value
1917	174	129, 351	$4, 109, 632	70	576, 608	$2, 777, 171	5	108, 409	$283, 271
1918	247	305, 869	8, 240, 386	110	818, 003	4, 445, 005	11	236, 103	977, 118
1919	42	54, 957	1, 791, 118	24	211, 632	965, 660	9	112, 303	352, 570
1920	56	94, 420	2, 396, 235	31	357, 279	1, 450, 518	6	279, 687	644, 572
1921	14	13, 531	495, 097	6	8, 439	42, 755	3	62, 670	147, 576
1922	18	13, 404	455, 160	9	344, 674	1, 071, 780	6	251, 614	632, 039
1923	36	31, 500	874, 973	41	319, 666	1, 158, 628	12	1, 072, 457	3, 598, 327
1924	39	56, 515	1, 307, 477	55	286, 470	929, 390	12	587, 026	1, 713, 943
1925	42	98, 324	1, 857, 769	53	267, 252	915, 316	11	1, 153, 268	2, 799, 403
1926	45	46, 258	1, 228, 663	54	364, 312	1, 179, 429	8	835, 412	1, 934, 381

Manganese and manganiferous ore (for fluxing purposes) shipped from mines in the United States, 1917–1926

Year	Ore containing 35 per cent of manganese or more		Ore containing 10 to 35 per cent of manganese		Ore containing 5 to 10 per cent of manganese	
	Long tons	Value	Long tons	Value	Long tons	Value
1917	54	$90	154, 151	$259, 121	21, 776	$86, 498
1918	-----	-----	98, 160	158, 785	18, 196	54, 671
1919	365	5, 745	98, 202	216, 868	11, 596	17, 394
1920	-----	-----	123, 970	332, 615	6, 728	10, 093
1921	-----	-----	22, 962	[1] 57, 000	3, 028	[1] 7, 800
1922	2, 278	17, 341	27, 705	[1] 52, 000	1, 666	[1] 10, 600
1923	769	(2)	40, 770	[1 2] 134, 133	1, 004	[1] 2, 510
1924	1, 833	(2)	24, 972	[1 2] 107, 215	-----	-----
1925	-----	-----	25, 384	[1] 36, 177	2, 150	[1] 1, 590
1926	-----	-----	17. 707	24, 679	-----	-----

[1] Partly estimated.

[2] Value for 35 per cent ore included with that for 10–35 per cent ore Bureau of Mines not at liberty to publish figures.

Manganese and manganiferous ore (exclusive of fluxing ore) shipped from mines in the United States, 1925–26, by States

State	Ore containing 35 per cent of manganese or more			Ore containing 10 to 35 per cent of manganese			Ore containing 5 to 10 per cent of manganese		
	Number of shippers	Long tons	Value	Number of shippers	Long tons	Value	Number of shippers	Long tons	Value
1925									
Alabama	2	938	$12,544	5	298	$3,087			
Arizona	3	294	5,102						
Arkansas	4	3,517	79,335	9	5,076	23,140			
California	3	869	17,525						
Colorado	1	743	5,127	5	7,352	26,565			
Georgia	8	1,649	20,281	20	28,038	133,215	5	7,349	$23,397
Massachusetts	1	(1)	(1)	1	(1)	(1)			
Michigan				2	98,753	(1)			
Minnesota				3	77,665	184,121	4	741,409	1,577,301
Montana:									
Metallurgical	4	55,659	585,031						
Chemical	3	20,529	825,970						
Nevada	2	850	(1)	1	6,659	(1)			
New Mexico	2	1,588	(1)	2	40,848	153,251			
North Carolina	2	(1)	(1)						
Tennessee	1	352	8,800	1	(1)	(1)			
Utah	1	50	(1)	3	666	5,754	1	496	(1)
Virginia:									
Metallurgical	3	1,499	22,981	1	1,800	(1)			
Chemical	1	1,622	77,000						
Washington	1	8,113	(1)						
Wisconsin							1	404,014	(1)
Undistributed		52	198,073		97	386,183			1,198,705
	42	98,324	1,857,769	53	267,252	915,316	11	1,153,268	2,799,403
1926									
Alabama	2	896	(1)	5	1,018	6,421			
Arizona	2	2,684	(1)	1	46	(1)			
Arkansas	4	2,450	64,010	12	8,195	47,428			
California	3	393	8,750						
Colorado				2	2,925	(1)			
Georgia	5	3,251	29,890	17	18,414	121,773	2	6,547	(1)
Idaho:									
Metallurgical	1	800	(1)	2	351	(1)			
Chemical	1	30	(1)						
Massachusetts				1	(1)	(1)			
Michigan				2	107,202	(1)			
Minnesota				2	158,759	(1)	5	799,458	1,791,350
Montana:									
Metallurgical	3	5,713	44,226						
Chemical	13	17,904	(1)						
Nevada	1	1,607	(1)	4	12,205	58,941			
New Mexico	1	1,966	(1)	2	52,033	(1)	1	29,407	(1)
North Carolina	1	55	(1)						
Tennessee	2	1,555	(1)	1	953	(1)			
Utah				1	(1)	(1)			
Virginia:									
Metallurgical	4	1,998	40,242	2	2,135	(1)			
Chemical	1	1,794	(1)						
Washington	1	3,162	(1)						
Undistributed			1,041,545		76	944,866			143,031
	45	46,258	1,228,663	54	364,312	1,179,429	8	835,412	1,934,381

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[1] Included under "Undistributed."

Manganiferous iron ore shipped from the Cuyuna district, Minnesota, 1917–1926 in long tons

Year	Ore containing 10 to 35 per cent of manganese	Ore containing 5 to 10 per cent of manganese	Year	Ore containing 10 to 35 per cent of manganese	Ore containing 5 to 10 per cent of manganese
1917	359, 542	91, 590	1922	305, 093	248, 560
1918	625, 009	227, 202	1923	253, 634	499, 181
1919	138, 952	98, 220	1924	159, 915	361, 527
1920	293, 524	248, 913	1925	77, 665	741, 409
1921		56, 530	1926	158, 759	799, 458

Manganese ore [1] imported for consumption in the United States, 1917–1926

Year	Long tons	Value	Year	Long tons	Value
1917	629, 972	$10, 262, 929	1922 [1] Jan. 1–Sept. 21	327, 727	$2, 695, 724
1918	491, 303	15, 095, 867	Sept. 22–Dec. 31	[2] 18, 124	364, 247
1919	333, 344	11, 229, 184	1923	[2] 78, 391	1, 674, 914
1920	606, 937	12, 230, 922	1924	[2] 224, 230	5, 305, 791
1921	401, 354	3, 365, 732	1925	[2] 277, 055	7, 417, 582
			1926	[2] 297, 630	9, 612, 673

[1] Prior to change in tariff, Sept. 22, 1922, figures represent ore; subsequently, figures represent manganese content of ore.

[2] Includes estimate by the Bureau of Mines for manganese content of ore imported from Cuba. The Bureau of Foreign and Domestic Commerce records only gross weight of Cuban ore imported, and the figures for such ore have been as follows: 1922 (Sept. 22 to Dec. 31), 190 long tons; 1923, 9,062 tons; 1924, 23,065 tons; 1925, 12,745 tons; 1926, 14,112 tons.

No separate record of exports of manganese ore is kept.

MANGANIFEROUS ZINC RESIDUUM

Manganiferous zinc residuum is recovered from roasted franklinite concentrates at Franklin Furnace, N. J. Nearly all of this residuum is reduced to spiegeleisen by the company that produces it. The Bureau of Mines is not at liberty to publish value.

Manganiferous residuum, from zinc roasting in the United States, shipped in 1917–1926, in long tons

1917	155, 332	1922	81, 333
1918	146, 796	1923	132, 801
1919	80, 418	1924	119, 457
1920	133, 602	1925	147, 937
1921	12, 627	1926	179, 926

MARLS

Calcareous marl sold by producers in the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	73, 900	$165, 223	1922	67, 777	$203, 196
1918	98, 694	261, 082	1923	99, 410	328, 932
1919	91, 437	327, 294	1924	72, 710	225, 383
1920	97, 487	322, 339	1925	68, 678	187, 839
1921	59, 730	195, 743	1926	55, 063	146, 094

Greensand marl produced in the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	408	$384	1922	7,885	$56,800
1918	3,582	4,775	1923	10,656	131,123
1919	(1)	(1)	1924	14,055	151,205
1920	(1)	(1)	1925	12,728	179,788
1921	2,058	10,200	1926	12,681	174,740

[1] Bureau of Mines not at liberty to publish figures.

No imports or exports of marl are reported.

MERCURY

Mercury produced in the United States, 1917–1926

[Flasks of 75 pounds]

Year	Flasks	Value	Year	Flasks	Value
1917	36,159	$3,808,266	1922	6,375	$368,348
1918	32,883	3,863,752	1923	7,937	521,302
1919	21,415	1,933,560	1924	10,085	692,739
1920	13,392	1,066,807	1925	9,174	762,616
1921	6,339	300,595	1926	7,642	702,323

Mercury imported into and exported from the United States, 1917–1926

Year	Imports for consumption		Exports	
	Flasks	Value	Flasks	Value
1917	5,207	$448,032	10,778	$998,470
1918	6,719	533,622	3,098	338,620
1919	10,635	791,226	9,107	817,328
1920	14,169	971,510	1,553	129,993
1921	10,601	457,993	393	18,869
1922	16,920	757,842	291	15,910
1923	18,073	816,043	318	25,195
1924	13,170	566,820	208	14,333
1925	20,855	1,200,878	204	15,930
1926	25,976	1,784,250	116	10,319

MICA

Mica[1] sold by producers in the United States, 1917–1926

Year	Sheet mica[1]		Scrap mica		Total[1]	
	Pounds	Value	Short tons	Value	Short tons	Value
1917	1,276,533	$753,874	3,429	$52,908	4,067	$806,782
1918	1,644,200	731,810	2,292	33,130	3,114	764,940
1919	1,545,709	483,567	3,258	58,084	4,031	541,651
1920	1,683,480	546,972	5,723	167,017	6,565	713,989
1921	741,845	118,513	2,577	56,849	2,948	175,362
1922	1,077,968	194,301	[2] 6,641	114,045	[2] 7,180	308,346
1923	2,063,179	311,180	[2] 8,054	129,695	[2] 9,086	440,875
1924	1,460,897	212,035	4,709	87,242	5,439	299,277
1925	1,793,865	321,962	9,695	173,537	10,592	495,499
1926	2,172,159	400,184	7,043	136,643	8,129	536,827

[1] For 1920 and later years the figures for sheet mica represent uncut sheet exclusively; for earlier years some cut sheet was included.

[2] Includes mica derived from mica schist.

Mica imported for consumption in the United States, 1917–1926

Year	Sheet				Ground		Total	
	Unmanufactured		Cut and splittings					
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
1917	656, 391	$414, 823	(1)	$1, 014, 181	92, 963	$1, 044	(1)	$1, 430, 048
1918	741, 429	658, 576	(1)	880, 906	11, 587	1, 647	(1)	1, 541, 129
1919	723, 713	726, 532	(1)	762, 228	62	9	(1)	1, 488, 769
1920	1, 298, 537	1, 177, 943	(1)	2, 011, 434			(1)	3, 189, 377
1921	328, 444	331, 219	(1)	758, 521	134, 650	2, 166	(1)	1, 091, 906
1922	385, 653	359, 793	(1)	[2] 966, 315	313, 745	4, 514	(1)	1, 330, 622
1923	1, 044, 366	532, 375	[3] 4, 419, 102	[3] 1, 844, 149	1, 867, 385	28, 324	7, 330, 853	2, 404, 848
1924	671, 793	419, 154	[3] 3, 787, 251	[3] 1, 885, 718	1, 342, 107	22, 034	5, 801, 151	2, 326, 906
1925	604, 550	526, 292	[3] 3, 346, 144	[3] 1, 259, 415	950, 614	13, 120	4, 901, 308	1, 798, 827
1926	818, 381	562, 300	[3] 5, 358, 983	[3] 1, 886, 486	140, 732	2, 048	6, 318, 096	2, 450, 834

[1] Quantity not reported.

[2] Includes also value of "built up, washers, and other manufactures" ($20,899) imported Sept. 22 to Dec. 31. Not separately classified prior to change in tariff.

[3] Composed of following: 1923, "Cut mica" 60,135 pounds, $49,268; "splittings" 4,301,727 pounds, $1,730,532; "built up" 30,032 pounds, $37,382; and "washers and other" 27,208 pounds, $26,967; 1924, "Cut mica" 74,534 pounds, $69,018; "splittings" 3,619,229 pounds, $1,681,774; "built up" 18,205 pounds, $41,455; and "washers and other" 75,283 pounds, $93,471; 1925, "Cut mica" 41,284 pounds, $63,466; "splittings" 3,239,554 pounds, $1,113,202; "built up" 14,639 pounds, $16,785; and "washers and other" 50,667 pounds, $65,962; 1926, "Cut mica" 46,662 pounds, $44,621; "splittings" 5,229,858 pounds, $1,750,434; "built up" 15,147 pounds, $15,410; and "washers and other" 67,316 pounds, $76,021.

Value of mica exported from the United States, 1917–1926

1917	$74, 485	1922	$129, 186
1918	74, 529	1923	182, 162
1919	109, 348	1924	169, 741
1920	316, 169	1925	198, 596
1921	153, 990	1926	230, 511

MILLSTONES

[See Abrasive materials]

MINERAL PAINTS

Domestic zinc and lead pigments,[1] made directly from ores in the United States, sold by producers, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	140, 636	$26, 972, 137	1922	162, 815	$22, 205, 400
1918	135, 746	26, 464, 590	1923	163, 240	23, 660, 381
1919	155, 648	25, 810, 671	1924	173, 859	25, 711, 159
1920	143, 244	24, 564, 572	1925	199, 190	28, 310, 631
1921	102, 463	14, 801, 032	1926	184, 289	25, 896, 269

[1] Include sublimed blue lead, sublimed white lead, leaded zinc oxide, and zinc oxide.

The canvass of natural mineral pigments was discontinued after 1915. Iron ore sold for paint, 1917 to 1926, is shown below.

Iron ore sold for paint, by producers, in the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	20, 895	$56, 859	1922	30, 668	$166, 682
1918	10, 034	22, 924	1923	27, 823	140, 306
1919	17, 885	84, 630	1924	23, 106	103, 626
1920	27, 382	112, 364	1925	29, 704	140, 986
1921	11, 624	56, 824	1926	23, 707	129, 541

MINERAL WATERS

Natural mineral waters sold by producers in the United States, 1917–1923 [1]

Year	Gallons	Value	Year	Gallons	Value
1917	46, 784, 419	$4, 931, 710	1921	34, 781, 238	$4, 876, 445
1918	40, 709, 722	4, 533, 001	1922	38, 492, 881	5, 498, 269
1919	38, 697, 280	4, 880, 186	1923	44, 430, 998	6, 493, 177
1920	36, 218, 260	4, 860, 915			

[1] Canvass discontinued after 1923.

Mineral waters (natural and artificial) imported for consumption in the United States, 1917–1926

Year	Gallons	Value	Year	Gallons	Value
1917	618, 405	$268, 665	1922	698, 751	$269, 245
1918	489, 487	241, 641	1923	722, 657	279, 875
1919	203, 014	116, 948	1924	758, 771	323, 908
1920	527, 114	203, 901	1925	794, 593	355, 411
1921	524, 765	167, 101	1926	807, 638	360, 221

Large quantities of a few domestic waters are exported, but no figures are available prior to 1922. Exports of natural and artificial mineral waters have been as follows: 1922, 209,219 gallons, valued at $169,473; 1923, 227,831 gallons, $193,248; 1924, 221,203 gallons, $179,418; 1925, 206,754 gallons, $178,828; 1926, 255,860 gallons, $191,798.

MOLYBDENUM

Molybdenum in ore and concentrates, produced in the United States, sold in 1917–1926

Year	Pounds	Value	Year	Pounds	Value
1917	350, 200	$495, 350	1922	------	------
1918	861, 637	1, 253, 700	1923	22, 667	(1)
1919	297, 926	341, 814	1924	297, 174	(1)
1920	34, 900	17, 207	1925	1, 154, 050	[2] $961, 324
1921	------	------	1926	(3)	(3)

[1] Value not reported.
[2] Estimate by Bureau of Mines.
[3] Bureau of Mines not at liberty to publish figures.

"Molybdenum ore [1] (steel-hardening)" imported for consumption in the United States, 1918–1926

Year	Pounds	Value	Year	Pounds	Value
1918—July to December [2]	[3] 140, 222	$123, 924	1923	[4] 16, 671	$13, 115
1919	[3] 106, 743	77, 572	1924	[4] 10, 379	9, 038
1920	[3] 15, 639	9, 707	1925	[4] 1, 954	1, 793
1921	[3] 29, 783	20, 471	1926	[4] 13, 397	11, 175
1922	[3] 412, 221	90, 015			

[1] Prior to Sept. 22, 1922, imports recorded as ore; beginning with change in tariff, recorded as molybdenum content of ore.
[2] Not separately classified prior to July, 1918.
[3] Recorded as molybdenum ore.
[4] Recorded as molybdenum content of ore.

For imports of ferromolybdenum, see under Ferro-alloys. Exports of ferromolybdenum are not separately classified.

MONAZITE

[See Thorium minerals]

NICKEL

Nickel content of nickel salts and metallic nickel produced in the United States as a by-product in the electrolytic refining of copper, 1917–1926, and from mixed ores in 1919 and 1920

Year	Short tons	Value	Year	Short tons	Value
1917	402	$331,556	1922	208	$133,191
1918	441	401,000	1923	100	71,605
1919 [1]	511	434,485	1924	191	114,903
1920 [1]	365	293,250	1925	272	169,664
1921	111	86,000	1926	323	234,558

[1] Including nickel produced from copper-lead-cobalt-nickel ores mined in Missouri.

Secondary nickel recovered as metal and in nonferrous alloys and salts in the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	[1] 860	$774,000	1922	1,512	$967,700
1918	1,393	1,532,300	1923	1,550	1,109,800
1919	2,447	1,829,400	1924	2,240	1,227,500
1920	2,200	1,733,600	1925	2,300	1,518,000
1921	945	680,400	1926	3,050	2,135,000

[1] Exclusive of recoveries by International Nickel Co. from scrap nickel or alloys.

Nickel imported for consumption in the United States, 1917–1926

Year	Nickel, nickel ore and matte, nickel oxide, and alloys of nickel with copper, etc.		Manufactures and nickel sheets and strips	Total value
	Pounds	Value		
1917	75,526,767	$9,617,163	$45,248	$9,662,411
1918	73,207,147	11,520,826	115,243	11,636,069
1919	36,565,462	8,334,564	90,451	8,425,015
1920	48,492,270	10,657,523	200,464	10,857,987
1921	4,400,453	1,220,347	107,155	1,327,502
1922	14,919,408	3,945,309	110,176	4,055,485
1923	40,670,189	6,602,096	94,832	6,696,928
1924	36,918,980	6,132,984	70,755	6,203,739
1925	43,071,073	7,772,320	98,761	7,871,081
1926	45,529,987	9,409,567	65,166	9,474,733

Nickel imported for consumption in the United States, 1925–26, by classes

Class	1925		1926	
	Pounds	Value	Pounds	Value
Unmanufactured:				
Nickel ore and matte (nickel content)	9,912,145	$1,062,844	14,635,651	$1,303,003
Nickel alloys, pigs, bars, etc.	31,876,710	6,532,495	29,408,950	7,865,493
Nickel oxide	1,282,218	176,981	1,485,386	241,071
Manufactured:				
Nickel or German silver in sheets, strips, and rods	7,565	4,369	6,476	4,743
All other manufactures of nickel	123,681	94,392	42,293	60,423
	43,202,319	7,871,081	45,578,756	9,474,733

Nickel, nickel oxide, and matte exported from the United States, 1917–1926[1]

Year	Pounds	Value	Year	Pounds	Value
1917	21,992,820	$8,936,620	1921	425,851	$103,372
1918	17,469,500	6,927,041	1922	9,317,520	1,016,091
1919	3,810,656	1,697,544	1923 [2]	11,200	626
1920	1,215,232	574,845			

[1] Not separately classified after 1923.
[2] Nickel oxide and matte only. Separate figures for nickel not available.

Nickel exported from the United States, 1925–26, by classes

Class	1925		1926	
	Pounds	Value	Pounds	Value
Nickel	2,569,185	$834,529	1,598,538	$428,820
Monel metal and other alloys				
Manufactures	529,906	360,628	(1)	575,048
Nickel or German silver in bars, rods, or sheets	492,964	135,906	1,539,480	336,265

[1] Quantity not recorded.

OILSTONES AND SCYTHESTONES

[See Abrasive materials]

ORE

Crude metallic ores (including tailings, etc.) shipped from or treated at the mine in the United States, 1921–1926, in short tons

[Figures rounded]

Class of ore	1921	1922	1923	1924	1925	1926
Aluminum ore (bauxite)	156,000	347,000	585,000	389,000	355,000	439,000
Chromite	300	400	250	320	120	160
Dry and siliceous (gold and silver) ore	8,436,000	8,728,000	9,122,000	8,979,000	8,995,000	8,743,000
Iron ore [1]	29,750,000	56,641,000	78,092,000	58,298,000	71,557,000	77,550,000
Manganese ore (35 per cent or more Mn)[1]	15,000	15,000	35,000	63,000	110,000	52,000
Manganiferous ore (5 to 35 per cent Mn)[1]	80,000	668,000	1,559,000	978,000	1,591,000	1,344,000
Mercury ore	35,000	43,000	51,000	70,000	65,000	51,000
Copper ore:						
Western States	9,221,000	21,383,000	39,433,000	43,344,000	45,430,000	49,356,000
Central States	3,611,000	4,952,000	5,363,000	5,373,000	7,037,000	7,642,000
Eastern States	564,000	558,000	777,000	715,000	795,000	638,000
	13,396,000	26,893,000	45,573,000	49,432,000	53,262,000	57,636,000
Copper-lead and copper-lead-zinc ore	14,000	52,000	162,000	220,000	229,000	282,000
Lead ore:						
Western States	2,054,000	2,124,000	2,288,000	2,359,000	2,271,000	2,024,000
Central States	5,075,000	5,162,000	5,320,000	6,205,000	6,287,000	6,330,000
Eastern States		2,000	5,500	5,000	2,000	4,000
	7,129,000	7,288,000	7,613,000	8,569,000	8,560,000	8,358,000
Lead-zinc ore:						
Western States	122,000	445,000	1,204,000	1,792,000	2,704,000	3,461,000
Central States	3,614,000	8,110,000	9,783,000	11,493,000	14,917,000	15,488,000
Eastern States				71,000	120,000	144,000
	3,736,000	8,555,000	10,987,000	13,356,000	17,741,000	19,093,000
Zinc ore:						
Western States	10,000	471,000	724,000	146,000	169,000	215,000
Central States	933,000	1,206,000	2,154,000	1,639,000	1,674,000	2,806,000
Eastern States	765,000	990,000	1,186,000	1,375,000	1,568,000	1,118,000
	1,708,000	2,667,000	4,064,000	3,160,000	3,411,000	4,139,000
Grand total	64,455,000	111,897,000	157,843,000	143,514,000	165,876,000	177,687,000

[1] Exclusive of fluxing ore.

PEAT

Peat produced in the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	97,363	$709,900	1922	60,680	$397,729
1918	107,261	1,047,243	1923	61,355	376,834
1919	69,197	705,532	1924	55,469	395,470
1920	73,204	921,732	1925	72,436	452,898
1921	30,406	260,119	1926	61,936	364,413

Peat moss imported for consumption in the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	506	$4,966	1922	4,805	$33,034
1918	----------	----------	1923	5,973	43,184
1919	464	16,345	1924	5,541	47,208
1920	2,762	36,201	1925	10,233	121,719
1921	3,450	22,754	1926	16,669	174,241

PETROLEUM AND PETROLEUM PRODUCTS

CRUDE PETROLEUM

Crude petroleum produced in the United States, 1917–1926

[Barrels of 42 United States gallons]

Year	Barrels	Value at wells	Year	Barrels	Value at wells
1917	335,316,000	$522,635,000	1922	557,531,000	$895,111,000
1918	355,928,000	703,944,000	1923	732,407,000	978,430,000
1919	378,367,000	760,266,000	1924	713,940,000	1,022,683,000
1920	442,929,000	1,360,745,000	1925	763,743,000	1,284,960,000
1921	472,183,000	814,745,000	1926	770,874,000	1,447,760,000

Crude petroleum produced in the United States, 1924–1926, by fields and States

	1924		1925		1926	
	Barrels	Value at wells	Barrels	Value at wells	Barrels	Value at wells
FIELD						
Appalachian	27, 056, 000	$80, 855, 000	27, 610, 000	$85, 440, 000	28, 572, 000	$89, 820, 000
Lima-Indiana	2, 287, 000	4, 550, 000	2, 120, 000	4, 580, 000	2, 030, 000	4, 710, 000
Illinois and southwestern Indiana	8, 747, 000	15, 420, 000	8, 512, 000	16, 480, 000	8, 418, 000	18, 660, 000
Michigan			4, 000	10, 000	94, 000	253, 000
Mid-Continent	375, 479, 000	549, 570, 000	424, 331, 000	732, 930, 000	423, 867, 000	851, 600, 000
Gulf coast	28, 569, 000	44, 620, 000	33, 112, 000	53, 360, 000	45, 275, 000	67, 600, 000
Rocky Mountain	[1] 42, 869, 000	[1] 53, 015, 000	35, 554, 000	61, 516, 000	[1] 37, 945, 000	[1] 69, 570, 000
California	228, 933, 000	274, 653, 000	232, 492, 000	330, 610, 000	224, 673, 000	345, 547, 000
Other fields [2]	(1)	(1)	8, 000	34, 000	(1)	(1)
	713, 940, 000	1, 022, 683, 000	763, 743, 000	1, 284, 960, 000	770, 874, 000	1, 447, 760, 000
STATE						
Alaska	(3)	(3)	8, 000	34, 000	7, 600	9, 600
Arkansas	46, 028, 000	43, 130, 000	77, 398, 000	68, 880, 000	58, 332, 000	64, 600, 000
California	228, 933, 000	274, 653, 000	232, 492, 000	330, 610, 000	224, 673, 000	345, 547, 000
Colorado	445, 000	490, 000	1, 226, 000	1, 810, 000	2, 768, 000	5, 100, 000
Illinois	8, 081, 000	14, 220, 000	7, 863, 000	15, 235, 000	7, 760, 000	17, 200, 000
Indiana	935, 000	1, 720, 000	829, 000	1, 615, 000	808, 000	1, 770, 000
Kansas	28, 836, 000	44, 400, 000	38, 357, 000	74, 410, 000	41, 498, 000	93, 800, 000
Kentucky	7, 407, 000	14, 592, 000	6, 759, 000	15, 682, 000	6, 274, 000	15, 250, 000
Louisiana	21, 124, 000	30, 340, 000	20, 272, 000	32, 500, 000	23, 201, 000	38, 200, 000
Michigan			4, 000	10, 000	94, 000	253, 000
Montana	2, 815, 000	3, 754, 000	4, 091, 000	6, 420, 000	7, 727, 000	10, 170, 000
New Mexico	98, 000	127, 000	1, 060, 000	1, 815, 000	1, 666, 000	3, 270, 000
New York	1, 440, 000	5, 245, 000	1, 695, 000	6, 270, 000	1, 956, 000	7, 200, 000
Ohio	6, 811, 000	17, 165, 000	7, 212, 000	18, 280, 000	7, 272, 000	19, 180, 000
Oklahoma	173, 538, 000	272, 450, 000	176, 768, 000	348, 230, 000	179, 195, 000	413, 900, 000
Pennsylvania	7, 486, 000	27, 025, 000	8, 097, 000	29, 310, 000	8, 961, 000	31, 930, 000
Tennessee	10, 000	18, 000	24, 000	53, 000	43, 000	100, 000
Texas	134, 522, 000	203, 870, 000	144, 648, 000	262, 270, 000	166, 916, 000	308, 700, 000
Utah	(3)	(3)	4, 000	4, 000	525	656
West Virginia	5, 920, 000	20, 840, 000	5, 763, 000	20, 055, 000	5, 946, 000	20, 560, 000
Wyoming	39, 498, 000	48, 600, 000	29, 173, 000	51, 467, 000	25, 776, 000	51, 020, 000
Undistributed [4]	13, 000	44, 000				
	713, 940, 000	1, 022, 683, 000	763, 743, 000	1, 284, 960, 000	770, 874, 000	1, 447, 760, 000

[1] Production of Alaska included with Rocky Mountain for 1924 and 1926.

[2] Alaska.

[3] Included under "Undistributed."

[4] Alaska and Utah.

Stocks of crude petroleum held in the United States on December 31, 1925–26, in barrels

		1925	1926
East of California:			
At refineries, by location of storage—			
East coast—			
Domestic		6, 844, 000	7, 240, 000
Foreign		2, 650, 000	2, 186, 000
Appalachian		1, 507, 000	1, 673, 000
Indiana, Illinois, etc		1, 318, 000	2, 224, 000
Oklahoma, Kansas, etc		3, 422, 000	2, 926, 000
Texas—			
Inland		944, 000	952, 000
Gulf coast—			
Domestic		5, 616, 000	8, 194, 000
Foreign		341, 000	236, 000
Arkansas and inland Louisiana		656, 000	601, 000
Louisiana, Gulf coast—			
Domestic		3, 242, 000	7, 019, 000
Foreign		1, 197, 000	802, 000
Rocky Mountain		1, 463, 000	1, 422, 000
Total at refineries		29, 200, 000	35, 475, 000
Pipe-line and tank-farm stocks—			
Domestic petroleum, by field of origin—			
Appalachian—			
New York, Pennsylvania, West Virginia, eastern and central Ohio	gross	7, 047, 000	6, 855, 000
	net	6, 745, 000	6, 570, 000
Kentucky	gross	1, 854, 000	1, 350, 000
	net	1, 748, 000	1, 220, 000
Lima-Indiana	gross	1, 173, 000	877, 000
	net	971, 000	666, 000
Illinois-southwestern Indiana	gross	11, 056, 000	12, 255, 000
	net	10, 582, 000	11, 770, 000
Mid-Continent—			
Oklahoma, Kansas, north, central, and western Texas	gross	165, 244, 000	154, 558, 000
	net	153, 012, 000	142, 208, 000
North Louisiana and Arkansas	gross	45, 186, 000	34, 318, 000
	net	42, 929, 000	31, 640, 000
Gulf coast	gross	19, 624, 000	20, 430, 000
	net	19, 263, 000	20, 031, 000
Rocky Mountain	gross	29, 040, 000	28, 129, 000
	net	28, 995, 000	28, 075, 000
Total pipe-line and tank-farm	gross	280, 224, 000	258, 772, 000
	net	264, 245, 000	242, 180, 000
Foreign crude petroleum held in United States by importers—			
At Atlantic coast stations		104, 000	165, 000
At Gulf coast stations		303, 000	444, 000
Total		407, 000	609, 000
Producers' stocks		7, 560, 000	5, 904, 000
Total crude stocks east of California		301, 412, 000	284, 168, 000
California:			
Light		44, 451, 000	30, 861, 000
Heavy (including fuel oil)		85, 783, 000	87, 270, 000

Indicated deliveries of crude petroleum (exclusive of California grades) to consumers in the United States, 1925–26, in barrels [1]

	1925	1926
Domestic petroleum, by field of origin:		
Appalachian	28, 397, 000	29, 343, 000
Lima-Indiana	2, 374, 000	2, 338, 000
Michigan	4, 000	94, 000
Illinois and southwestern Indiana	8, 811, 000	7, 241, 000
Mid-Continent	439, 742, 000	447, 713, 000
Gulf coast	34, 004, 000	44, 484, 000
Rocky Mountain [2]	35, 310, 000	38, 709, 000
Deliveries and exports	548, 642, 000	569, 922, 000
Exports	10, 153, 000	10, 022, 000
Deliveries	538, 489, 000	559, 900, 000
Foreign petroleum	61, 941, 000	60, 179, 000
	600, 430, 000	620, 079, 000

[1] Indicated deliveries equal production plus imports plus stocks, exclusive of refinery stocks, at beginning of period minus exports and stocks at end of period.

[2] Alaska included with Rocky Mountain.

Crude petroleum imported into and exported from the United States, 1917–1926

Year	Imports for consumption		Exports			
	Barrels	Value	Domestic petroleum		Foreign petroleum [1]	
			Barrels	Value	Barrels	Value
1917	30, 162, 583	$16, 400, 017	4, 098, 124	$7, 668, 312	40, 185	$60, 331
1918	37, 735, 641	21, 319, 464	4, 900, 691	12, 084, 250	32	201
1919	52, 821, 567	26, 442, 881	5, 924, 320	14, 805, 546	94, 331	42, 520
1920	106, 175, 289	55, 799, 254	8, 044, 907	28, 990, 444	712, 185	996, 430
1921	125, 363, 983	66, 547, 379	8, 865, 497	20, 204, 491	74, 136	57, 407
1922	127, 308, 423	70, 383, 309	9, 995, 093	18, 348, 110	167, 724	74, 121
1923	82, 015, 025	53, 882, 259	17, 060, 771	23, 111, 832	324, 607	150, 358
1924	77, 775, 173	73, 841, 507	17, 604, 877	26, 495, 011	367, 662	165, 401
1925	61, 824, 242	75, 406, 956	13, 125, 157	24, 274, 905	209, 950	94, 372
1926	60, 382, 329	79, 307, 877	15, 406, 045	28, 495, 773	1, 353	4, 436

[1] Exports of refined products and shipments of crude petroleum to Alaska, Hawaii, Porto Rico, and the Philippine Islands are not included.

PETROLEUM PRODUCTS

Crude petroleum run to stills and chief petroleum products produced at refineries in the United States, 1917–1926, in barrels

Year	Crude petroleum run to stills		Chief petroleum products			
	Domestic	Foreign	Gasoline	Kerosene	Gas and fuel oils	Lubricants
1917	315, 132, 000		67, 870, 000	41, 114, 000	155, 079, 000	17, 947, 000
1918	326, 025, 000		85, 007, 000	43, 461, 000	174, 319, 000	20, 035, 000
1919	361, 520, 000		94, 235, 000	55, 753, 000	181, 602, 000	20, 161, 000
1920	433, 915, 000		116, 251, 000	55, 240, 000	210, 987, 000	24, 938, 000
1921	443, 363, 000		122, 704, 000	46, 313, 000	230, 091, 000	20, 896, 000
1922	425, 823, 000	74, 883, 000	147, 672, 000	54, 913, 000	254, 910, 000	23, 304, 000
1923	538, 252, 000	42, 986, 000	179, 903, 000	55, 927, 000	287, 481, 000	26, 128, 000
1924	597, 954, 000	45, 765, 000	213, 326, 000	60, 026, 000	320, 476, 000	27, 498, 000
1925	698, 582, 000	41, 338, 000	259, 601, 000	59, 689, 000	364, 991, 000	31, 055, 000
1926	734, 301, 000	44, 963, 000	299, 734, 000	61, 768, 000	365, 195, 000	32, 293, 000

Chief petroleum products imported for consumption in the United States, 1917–1926 in barrels

Year	Gasoline	Kerosene	Gas and fuel oils	Lubricants
1917	249, 872	(1)	(1)	(1)
1918	307, 127	(1)	(1)	(1)
1919	202, 861	(1)	(1)	(1)
1920	963, 764	(1)	(1)	(1)
1921	900, 381	(1)	(1)	(1)
1922	1, 479, 349	[2] 3, 487	[2] 2, 947, 102	[2] 43, 057
1923	4, 555, 084	7, 178	12, 286, 260	29, 027
1924	3, 452, 923	9, 942	12, 926, 837	10, 761
1925	3, 812, 790	19, 281	12, 245, 468	37, 475
1926	5, 539, 585	74, 097	14, 432, 175	33, 018

(1) Not separately classified prior to Sept. 22, 1922.

[2] Figures cover Sept. 22 to Dec. 31, 1922; not separately classified prior to change in tariff.

Chief petroleum products exported from the United States, 1917–1926, in barrels

Year	Gasoline	Kerosene	Gas and fuel oils	Lubricants
1917	9, 901, 877	15, 670, 392	26, 749, 358	6, 677, 087
1918	13, 318, 306	11, 693, 091	28, 589, 293	6, 126, 601
1919	8, 860, 309	23, 313, 218	13, 924, 991	6, 542, 742
1920	15, 269, 280	20, 730, 120	19, 704, 625	9, 574, 320
1921	12, 692, 270	17, 832, 693	20, 120, 493	6, 888, 491
1922	13, 787, 191	21, 315, 015	16, 600, 462	7, 889, 516
1923	20, 135, 567	20, 188, 796	29, 252, 245	8, 295, 726
1924	28, 246, 078	21, 817, 890	34, 292, 709	9, 030, 944
1925	30, 637, 804	21, 074, 667	32, 508, 547	9, 596, 484
1926	42, 479, 876	22, 016, 214	34, 516, 390	9, 265, 781

PHOSPHATE ROCK

Phosphate rock sold or used by producers in the United States, 1917–1926

Year	Long tons	Value	Year	Long tons	Value
1917	2, 584, 287	$7, 771, 084	1922	2, 417, 883	$10, 482, 846
1918	2, 490, 760	8, 214, 463	1923	3, 006, 706	11, 576, 049
1919	2, 271, 983	11, 591, 268	1924	2, 867, 789	10, 252, 083
1920	4, 103, 982	25, 079, 572	1925	3, 481, 819	11, 545, 678
1921	2, 064, 025	12, 270, 070	1926	3, 209, 976	10, 893, 800

Phosphate rock imported into and exported from the United States, 1917–1926

Year	Imports for consumption		Exports	
	Long tons	Value	Long tons	Value
1917	92	$1,169	166,358	$835,045
1918			143,455	912,485
1919	34	457	378,731	3,567,982
1920	63	2,090	1,069,712	10,570,175
1921	3,535	43,960	733,312	7,320,137
1922	5,890	95,846	719,294	5,858,167
1923	6,725	92,263	827,551	5,772,171
1924	16,098	181,515	818,773	5,120,832
1925	2,735	37,932	870,200	5,677,763
1926	17,378	192,611	748,963	4,435,590

PLATINUM AND ALLIED METALS

Reports received from refiners of crude platinum, gold bullion, and copper indicate that 84,981 troy ounces of refined new metals of the platinum group were recovered in 1926, of which 11,165 ounces are believed to be of domestic origin.

New platinum and allied metals recovered by refiners in the United States, 1917–1926, in troy ounces

Year	Platinum	Palladium	Iridium	Osmiridium	Other	Total
1917	33,009	4,779	210	833		38,831
1918	54,399	4,024	465	539	326	59,753
1919	40,220	3,807	401	402	279	45,109
1920	36,015	4,309	418	409	393	41,544
1921	51,791	2,686	286	581	1,026	56,370
1922	54,142	1,943	210	1,301	122	57,718
1923	46,780	1,934	280	787	16	49,797
1924	57,827	6,065	680	1,261	174	66,007
1925	41,300	7,358	283	648	54	49,643
1926	76,154	6,437	234	2,113	43	84,981

Dealers and refiners reported recovery in 1926 of 46,137 ounces of secondary platinum metals derived from refining scrap and sweeps. The figures that make up this total probably represent some duplication, as the same metal may be handled as scrap several times in a year.

Secondary platinum and allied metals recovered in the United States, 1917–1926, in troy ounces

Year	Platinum	Palladium	Iridium	Other	Total
1917	59,007	3,347	9,832		72,186
1918	40,378	1,795	3,410		45,583
1919	54,545	3,467	3,504		61,516
1920	51,255	3,100	3,355		57,710
1921	39,131	4,887	1,776	229	46,023
1922	40,062	4,193	1,937	496	46,688
1923	39,152	6,246	2,021	453	47,872
1924	45,474	5,784	2,200	1,013	54,471
1925	35,578	4,680	1,827	1,189	43,274
1926	38,795	5,647	1,478	217	46,137

Platinum and allied metals imported for consumption in the United States, 1917–1926

Year	Troy ounces	Value	Year	Troy ounces	Value
1917	35,773	$2,957,197	1922	110,025	$8,983,547
1918	56,756	5,167,908	1923	106,637	10,466,705
1919	68,054	6,747,447	1924	111,359	11,030,349
1920	100,546	10,617,440	1925	125,802	13,230,148
1921	78,378	5,418,464	1926	134,797	13,451,835

Platinum and allied metals imported for consumption in the United States, 1925–26, by metals

Metal	1925		1926	
	Troy ounces	Value	Troy ounces	Value
Platinum:				
Ores of platinum metals (platinum content)	757	$71,386	1,221	$124,668
Grains, nuggets, sponge, or scrap	58,718	5,725,015	87,162	8,683,359
Ingots, bars, sheets or plates, not less than one-eighth inch thick	47,002	5,504,068	26,585	2,995,582
	106,477	11,300,469	114,968	11,803,609
Manufactures of, except jewelry	62	6,991	5	646
Iridium	2,349	586,913	3,305	411,646
Osmiridium	3,236	446,276	684	64,714
Osmium	1,050	120,845	5,457	594,042
Palladium	8,296	483,349	8,258	460,015
Rhodium	2,476	169,687	1,362	78,907
Ruthenium	1,856	115,618	758	38,256
	125,802	13,230,148	134,797	13,451,835

Platinum exported from the United States, 1917–1926

Year	Unmanufactured		Manufactures of, except jewelry	
	Troy ounces	Value	Troy ounces	Value
1917	3,445	$234,433	(1)	$65,415
1918	119	13,511	(1)	23,562
1919	522	75,066	(1)	54,529
1920	1,302	177,115	(1)	111,014
1921	3,272	244,473	741	85,216
1922 Crude, scrap, and old	143	13,149	486	35,967
1922 Ingots, sheets, wire, and alloys	1,313	127,047		
1923	1,151	128,599	592	65,073
1924	5,854	643,282	1,274	136,948
1925	16,234	1,787,122	3,537	249,975
1926	11,573	1,253,795	1,898	160,648

[1] Quantity not recorded.

POTASH

Crude potassium salts produced and sold in the United States, 1917–1926

Year	Produced			Sold [1]		
	Number of plants	Gross weight (short tons)	K_2O content (short tons)	Gross weight (short tons)	K_2O content (short tons)	Value f. o. b. plant
1917	95	126, 961	32, 573	126, 961	32, 573	$13, 980, 577
1918	128	207, 686	54, 803	140, 343	38, 580	15, 839, 618
1919	102	116, 634	32, 474	166, 063	45, 728	11, 271, 269
1920	66	166, 834	48, 077	139, 963	41, 444	7, 463, 026
1921	20	25, 485	10, 171	10, 337	4, 408	447, 859
1922	12	25, 176	11, 714	22, 028	11, 313	463, 512
1923	12	39, 029	20, 215	35, 164	19, 281	784, 671
1924	12	43, 734	22, 903	37, 492	21, 880	842, 618
1925	9	51, 565	25, 448	52, 823	25, 802	1, 204, 024
1926	7	46, 324	23, 366	51, 369	25, 060	1, 083, 064

[1] Production and sales were practically the same in 1917, and no distinction was made between them.

Potash materials imported for consumption in the United States, 1917–1926

Year	Potassium salts used mainly in the fertilizer industry [1]			Potassium salts used mainly in chemical industries [2]			Total		
	Short tons		Value	Short tons		Value	Short tons		Value
	Gross weight	K_2O content		Gross weight	K_2O content		Gross weight	K_2O content	
1917	1, 165	504	$189, 159	24, 122	7, 596	$7, 599, 247	25, 287	8, 100	$7, 788, 406
1918	525	261	117, 438	23, 894	7, 696	8, 790, 398	24, 419	7, 957	8, 907, 836
1919	127, 416	28, 484	4, 163, 739	33, 430	11, 135	6, 028, 077	160, 846	39, 619	10, 191, 816
1920	918, 698	197, 795	33, 885, 627	63, 564	26, 997	9, 504, 156	982, 262	224, 792	43, 389, 783
1921	212, 752	64, 126	7, 743, 364	32, 453	14, 572	3, 739, 090	245, 205	78, 698	11, 482, 454
1922	632, 711	186, 264	10, 951, 197	34, 198	15, 151	4, 415, 891	666, 909	201, 415	15, 367, 088
1923	712, 701	194, 210	10, 633, 475	35, 824	15, 740	4, 771, 097	748, 525	209, 950	15, 404, 572
1924	663, 914	187, 079	10, 042, 575	28, 336	13, 286	3, 325, 552	692, 250	200, 365	13, 368, 127
1925	892, 684	239, 167	12, 730, 019	44, 429	19, 050	4, 641, 747	937, 113	258, 217	17, 371, 766
1926	859, 422	245, 700	13, 635, 154	47, 941	20, 580	4, 796, 711	907, 363	266, 280	18, 431, 865

[1] Includes kainite, manure salts, muriate, and sulphate. Considerable quantities of muriate and some sulphate were used in chemical industries.

[2] Includes bicarbonate, bichromate, bitartrate, bromide, carbonate, caustic, chlorate, chromate, cyanide, ferricyanide, ferrocyanide, iodide, nitrate, perchlorate, permanganate, and Rochelle salt.

Domestic potassium salts exported from the United States, 1917–1926

Year	Gross weight (short tons)	Value	Year	Gross weight (short tons)	Value
1917 [1]	(2)	$1, 114, 202	1922	6, 238	$780, 996
1918	(2)	1, 372, 170	1923	3, 997	505, 837
1919	(2)	2, 755, 544	1924	1, 923	301, 036
1920	(2)	3, 562, 015	1925	2, 155	398, 740
1921	(2)	335, 993	1926	1, 679	319, 201

[1] Figures cover 6 months, July to December. Exports not separately recorded prior to July, 1917.

[2] Figures not available.

PUMICE

[See Abrasive materials]

PYRITES

Pyrites produced in the United States, 1917–1926

Year	Long tons	Value	Year	Long tons	Value
1917	482, 662	$2, 593, 035	1922	169, 043	$671, 241
1918	464, 494	2, 644, 515	1923	181, 628	661, 000
1919	420, 647	2, 558, 172	1924	160, 096	645, 262
1920	310, 777	1, 596, 961	1925	170, 081	650, 448
1921	157, 118	711, 432	1926	166, 559	616, 668

Pyrites containing more than 25 per cent of sulphur imported for consumption in the United States, 1917–1926

Year	Long tons	Value	Year	Long tons	Value
1917	967, 340	$5, 981, 457	1922	279, 445	$1, 199, 076
1918	496, 792	2, 741, 676	1923	263, 695	1, 254, 389
1919	388, 973	2, 176, 565	1924	246, 737	598, 544
1920	332, 606	1, 660, 832	1925	276, 385	773, 925
1921	216, 229	818, 852	1926	366, 151	856, 981

Exports of "pyrites or other sulphur ore" in 1922 amounted to 323 long tons, valued at $4,325. Data for other years are not separately shown.

QUARTZ

[See under Silica]

QUICKSILVER

[See Mercury]

RADIUM

[See Uranium and vanadium ores]

RUTILE

[See Titanium minerals]

SALT

Salt sold or used by producers in the United States, 1917–1926

Year	Short tons				Total value
	Manufactured (evaporated)	In brine	Rock salt	Total	
1917	2, 482, 564	2, 890, 588	1, 605, 025	6, 978, 177	$19, 940, 442
1918	2, 724, 203	2, 830, 600	1, 683, 941	7, 238, 744	26, 940, 361
1919	2, 392, 290	2, 850, 639	1, 639, 973	6, 882, 902	27, 074, 694
1920	2, 409, 924	2, 819, 916	1, 610, 189	6, 840, 029	29, 894, 075
1921	1, 931, 243	1, 577, 335	1, 472, 576	4, 981, 154	24, 557, 966
1922	2, 276, 683	2, 569, 042	1, 947, 124	6, 792, 849	27, 464, 838
1923	2, 239, 872	2, 787, 239	2, 103, 602	7, 130, 713	27, 795, 941
1924	2, 224, 555	2, 513, 853	2, 064, 707	6, 803, 115	25, 747, 048
1925	2, 235, 170	2, 819, 690	2, 342, 640	7, 397, 500	26, 162, 361
1926	2, 198, 060	3, 037, 820	2, 135, 720	7, 371, 600	25, 055, 012

Salt sold or used by producers in the United States, 1925–26, by States

State	1925		1926	
	Short tons	Value	Short tons	Value
California	292, 480	$1, 420, 924	288, 440	$1, 397, 587
Kansas	812, 540	2, 494, 423	729, 880	2, 741, 534
Louisiana	500, 350	2, 218, 265	520, 400	2, 457, 875
Michigan	2, 172, 600	7, 710, 331	2, 260, 320	7, 594, 418
New York	2, 053, 970	7, 133, 244	2, 001, 580	6, 564, 829
Ohio	1, 173, 590	4, 116, 625	1, 164, 400	3, 209, 473
Porto Rico	12, 060	28, 751	10, 480	19, 182
Utah	88, 150	432, 846	77, 350	422, 317
West Virginia	25, 870	180, 053	23, 180	170, 953
Undistributed [1]	265, 890	426, 899	295, 570	476, 844
	7, 397, 500	26, 162, 361	7, 371, 600	25, 055, 012

[1] 1925: Idaho, Nevada, New Mexico, Texas, and Virginia; 1926: Idaho, Nevada, New Mexico, Oklahoma, Texas, and Virginia.

Salt imported into and exported from the United States, 1917–1926

Year	Imports for consumption		Exports	
	Short tons	Value	Short tons	Value
1917	64, 922	$280, 135	113, 993	$1, 000, 773
1918	40, 290	281, 468	136, 783	1, 677, 577
1919	59, 514	242, 704	119, 416	1, 396, 625
1920	137, 654	676, 499	139, 272	1, 901, 593
1921	93, 095	531, 031	109, 563	1, 415, 471
1922	113, 922	522, 338	134, 989	1, 429, 172
1923	88, 750	383, 258	125, 529	1, 211, 226
1924	88, 938	324, 092	144, 945	1, 288, 376
1925	85, 788	316, 827	155, 079	1, 219, 935
1926	55, 964	202, 243	158, 908	1, 277, 790

SAND AND GRAVEL

Sand and gravel sold or used by producers in the United States, 1917–1926

Year	Glass sand		Molding sand		Building sand	
	Short tons	Value	Short tons	Value	Short tons	Value
1917	1, 942, 675	$2, 685, 014	4, 660, 968	$4, 303, 809	25, 374, 987	$9, 837, 688
1918	2, 172, 887	4, 209, 728	4, 910, 178	5, 121, 865	19, 686, 885	9, 772, 556
1919	1, 827, 409	3, 593, 371	3, 774, 612	4, 153, 990	21, 969, 736	12, 296, 664
1920	2, 165, 926	4, 748, 690	5, 128, 075	7, 504, 759	26, 539, 365	17, 956, 635
1921	1, 280, 359	2, 314, 314	1, 906, 977	2, 451, 966	24, 565, 605	16, 053, 413
1922	1, 768, 549	2, 866, 366	3, 839, 116	4, 478, 405	29, 375, 466	17, 574, 579
1923	2, 034, 958	3, 751, 778	5, 559, 644	6, 730, 417	39, 234, 762	23, 751, 244
1924	2, 169, 899	3, 718, 973	4, 403, 893	4, 995, 268	41, 376, 425	23, 455, 393
1925	2, 334, 921	3, 836, 085	4, 995, 428	5, 400, 618	45, 287, 240	26, 306, 463
1926	2, 274, 218	3, 615, 371	5, 309, 166	5, 630, 799	45, 327, 512	24, 891, 475

Sand and gravel sold or used by producers in the United States, 1917–1926—Con.

Year	Other sand		Gravel		Total	
	Short tons	Value	Short tons	Value	Short tons	Value
1917	8, 866, 876	$4, 962, 232	35, 573, 819	$13, 508, 189	76, 419, 325	$35, 296, 932
1918	6, 349, 870	5, 259, 620	28, 704, 606	13, 563, 310	61, 824, 426	37, 927, 079
1919	8, 397, 979	6. 345, 654	34, 606, 671	19, 561, 877	70, 576, 407	45, 951, 556
1920	9, 942, 776	8, 988, 530	38, 265, 246	26, 462, 991	82, 041, 388	65, 661, 605
1921	10, 542, 013	8, 230, 257	41, 550, 054	27, 434, 295	79, 845, 008	56, 484, 245
1922	14, 711, 792	10, 550, 570	45, 172, 123	29, 147, 744	94, 867, 046	64, 617, 664
1923	20, 535, 907	14, 240, 126	72, 566, 882	42, 430, 089	139, 932, 153	90, 903, 654
1924	27, 621, 793	16, 674, 831	80, 658, 053	48, 168, 650	156, 230, 063	97, 013, 115
1925	34, 564, 633	19, 605, 159	84, 819, 251	52, 393, 798	172, 001, 473	107, 542, 123
1926	39, 203, 383	21, 538, 343	90, 986, 539	55, 662, 713	183, 100, 818	111, 338, 701

Sand and gravel imported into and exported from the United States, 1917–1926

Year	Imports for consumption		Exports	
	Short tons	Value	Short tons	Value
1917	(1)	$142, 586	(2)	$494, 251
1918	(1)	91, 465	(2)	619, 414
1919	597, 481	126, 586	(2)	382, 070
1920	1, 226, 684	912, 282	(2)	669, 945
1921	906, 905	771, 734	(2)	379, 982
1922	[3] 451, 943	[3] 238, 386	356, 520	400, 199
1923	[4] 477, 762	[4] 259, 820	551, 233	598, 633
1924	[4] 701, 410	[4] 280, 206	314, 140	401, 662
1925	[4] 534. 555	[4] 233, 422	425, 612	496, 050
1926	[4] 947, 579	[4] 341, 911	424, 374	610, 023

[1] Quantities not recorded prior to July, 1918. During last 6 months of 1918 the imports were 284,036 tons, valued at $46,910.

[2] Quantities not recorded prior to 1922.

[3] Includes 65,848 tons of gravel, valued at $27,434, and 1,290 tons of glass sand, valued at $1,112, imported after change in tariff Sept. 22. Not separately shown prior to that time.

[4] Includes: 1923, 198,960 tons of gravel, valued at $99,687, and 2,309 tons of glass sand, valued at $3,008; 1924, 448,586 tons, $155,146, and 6,479 tons, $1,961; 1925, 224,600 tons, $89,505, and 4,186 tons, $2,262; and 1926, 239,476 tons, $90,226, and 8,817 tons, $9,091, respectively.

SAND-LIME BRICK

Sand-lime brick sold in the United States, 1917–1926 [1]

Year	Number of operators	Thousands	Value	Year	Number of operators	Thousands	Value
1917	47	187, 546	$1, 420, 330	1922	(1)	(1)	(1)
1918	42	98, 399	883, 929	1923 [2]	33	213, 425	$2, 471, 536
1919	35	146, 947	1, 705, 163	1924 [2]	37	283, 417	3, 334, 503
1920	37	169, 761	2, 490, 283	1925 [2]	42	315, 595	3, 780, 639
1921 [2]	26	97, 126	1, 268, 502	1926 [2]	42	330, 586	3, 981, 492

[1] Canvass discontinued by U. S. Geological Survey after 1920. No canvass for 1922.

[2] According to Bureau of the Census. Figures represent production.

Imports of sand-lime brick were not reported separately until 1924. The figures for 1924 are 22,426,000 brick, valued at $129,042; for 1925, 148,000 brick, $1,004; and for 1926, 3,095,000 brick, $28,748.

Exports are not reported separately.

SELENIUM

Most of the selenium produced is a by-product in the electrolytic refining of copper.

Selenium, produced in the United States, sold in 1917–1926

Year	Pounds	Value	Year	Pounds	Value
1917	39, 630	$70, 000	1922	123, 565	$177, 542
1918	103, 694	206, 540	1923	127, 174	237, 196
1919	60, 025	125, 966	1924	153, 762	286, 066
1920	92, 141	175, 508	1925	194, 007	330, 637
1921	55, 978	89, 148	1926	252, 312	438, 132

Selenium and selenium salts imported for consumption in the United States, 1917–1926

Year	Pounds	Value	Year	Pounds	Value
1917	(1)	$2, 236	1922	1, 652	$2, 530
1918	----------	----------	1923	940	1, 653
1919	(1)	25, 866	1924	300	606
1920	----------	----------	1925	5, 807	10, 582
1921	1, 106	2, 099	1926	18, 885	34, 680

[1] Total quantity not recorded.

Exports of selenium are not separately recorded.

SILICA

Quartz sold or used by producers in the United States, 1917–1926

Year	Crude		Ground		Total	
	Short tons	Value	Short tons	Value	Short tons	Value
1917	126, 575	$120, 856	16, 098	$197, 213	142, 673	$318, 069
1918	61, 008	121, 888	10, 732	137, 442	71, 740	259, 330
1919	51, 774	135, 187	11, 558	238, 384	63, 332	373, 571
1920	59, 423	142, 397	8, 767	177, 953	68, 190	320, 350
1921	8, 570	39, 660	2, 682	45, 297	11, 252	84, 957
1922	5, 085	23, 093	5, 568	78, 254	10, 653	101, 347
1923	14, 159	66, 723	6, 442	126, 907	20, 601	193, 630
1924	20, 570	123, 099	3, 191	80, 078	23, 761	203, 177
1925	22, 312	143, 861	3, 132	61, 515	25, 444	205, 376
1926	22, 230	159, 052	5, 513	115, 281	27, 743	274, 333

Silica sold or used by producers in the United States for pottery, paints, fillers, polishers, abrasives, and other uses, 1925–26

Material	1925		1926	
	Short tons	Value	Short tons	Value
Quartz (vein quartz, pegmatite, and quartzite)	25, 444	$205, 376	27, 743	$274, 333
Sand and sandstone [1]	263, 981	1, 857, 263	270, 468	1, 928, 793
Tripoli (including rottenstone) (ground and otherwise prepared)	29, 388	434, 886	31, 369	523, 609
Diatomite	73, 030	922, 281	87, 126	1, 081, 564
	391, 843	3, 419, 806	416, 706	3, 808, 299

[1] Includes only finely ground material. Figures probably incomplete.

Imports of crude silica in 1926 were 27 short tons, valued at $149; in 1925, 22 tons, $486; in 1924, 12 tons, $254; and in 1923, 34 tons, $550. Similar imports were not recorded prior to September 22, 1922, but from that date to the end of the year 1 ton, valued at $45, was imported. The Bureau of Foreign and Domestic Commerce records imports of "flint, flints, and flint stones, unground," from several countries. These imports are partly flint pebbles for use in grinding mills and partly material for uses such as are listed above. The figures can not be accurately separated.

"Flint, flints, and flint stones, unground" imported for consumption in the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	(1)	$197,156	1922	16,040	$145,805
1918	(1)	127,808	1923	15,952	130,974
1919	19,798	250,096	1924	17,473	114,958
1920	26,636	338,630	1925	16,240	105,041
1921	10,084	116,157	1926	15,091	120,078

[1] Quantities not recorded prior to July, 1918. During last six months of 1918 the imports were 5,224 tons, valued at $55,440.

No exports of silica are reported.

SILVER

[See under Gold and silver]

SLATE

Slate sold by producers in the United States, 1917–1926, by uses

Year	Roofing slate		Mill stock		Slate for other uses[1]	Total value
	Number of squares (100 square feet)	Value	Square feet	Value		
1917	703,667	$3,411,740	10,663,000	$1,799,917	$538,309	$5,749,966
1918	379,817	2,219,131	7,204,000	1,853,603	768,386	4,841,120
1919	454,337	3,085,957	7,466,000	1,782,793	1,161,898	6,030,648
1920	396,230	3,524,658	9,910,000	3,147,281	2,054,503	8,726,442
1921	348,085	3,197,745	8,970,000	2,719,723	1,404,538	7,322,006
1922	479,243	4,069,761	9,276,800	2,899,195	2,207,828	9,176,784
1923	507,587	4,582,535	11,109,480	4,159,644	3,334,445	12,076,624
1924	469,393	4,626,614	10,009,180	3,922,366	3,227,036	11,776,016
1925	494,530	5,084,945	11,077,860	4,231,477	3,258,904	12,575,326
1926	465,900	5,079,087	10,278,130	4,191,185	3,082,495	12,352,767

[1] Chiefly slate granules.

Value of slate sold by producers in the United States, 1922–1926, by States

State	1922	1923	1924	1925	1926
California		(1)	(1)		$2, 976
Maine	$464, 713	$754, 826	$667, 541	$604, 062	662, 184
Maryland	(1)	(1)	117, 137	210, 148	207, 989
New York	642, 972	927, 398	962, 276	851, 715	913, 814
Pennsylvania	4, 324, 294	5, 587, 670	5, 157, 868	5, 885, 179	5, 413, 177
Vermont	2, 907, 858	3, 857, 287	4, 010, 346	3, 963, 025	4, 267, 041
Virginia	[2] 312, 652	[2] 321, 010	[2] 336, 627	[2] 377, 082	[2] 331, 651
Undistributed [3]	[4] 524, 295	[4] 628, 433	[4] 524, 221	[4] 684, 115	[4] 553, 935
	9, 176, 784	12, 076, 624	11, 776, 016	12, 575, 326	12, 352, 767

[1] Included under "Undistributed."
[2] Exclusive of value of granules, etc., which is included under "Undistributed."
[3] 1922: Georgia, Maryland, New Jersey, and Tennessee; 1923: California, Georgia, Maryland, New Jersey, and Tennessee; 1924: California, Georgia, and Tennessee; 1925: Georgia, Tennessee, and Utah; 1926: Arkansas, Georgia, and Tennessee.
[4] Includes also value of granules, etc., for Virginia.

Slate sold by producers in the United States, 1925–26, by uses

Use	1925		1926	
	Quantity	Value	Quantity	Value
Roofing squares	494, 530	$5, 084, 945	465, 900	$5, 079, 087
Approximate equivalent in short tons	166, 000		157, 450	
Electrical square feet	1, 655, 810	1, 376, 948	1, 857, 940	1, 537, 034
Approximate equivalent in short tons	11, 900		13, 350	
Structural and sanitary square feet	2, 332, 700	862, 019	2, 590, 340	988, 521
Approximate equivalent in short tons	16, 700		18, 550	
Grave vaults and covers square feet	523, 850	125, 582	490, 060	130, 882
Approximate equivalent in short tons	7, 500		6, 900	
Blackboards and bulletin boards square feet	5, 184, 060	1, 690, 612	3, 998, 800	1, 356, 405
Approximate equivalent in short tons	13, 900		10, 700	
Billiard table tops square feet	341, 440	140, 498	367, 220	145, 457
Approximate equivalent in short tons	2, 500		2, 700	
School slates pieces	1, 944, 320	35, 818	1, 820, 820	32, 886
Approximate equivalent in square feet	1, 040, 000		973, 770	
Approximate equivalent in short tons	1, 400		1, 300	
Granules short tons	497, 700	3, 210, 904	498, 050	3, 009, 368
Other short tons (estimated)	7, 000	48, 000	9, 000	73, 127
Total (quantities approximate, in short tons)	724, 600	12, 575, 326	718, 000	12, 352, 767

Value of slate imported for consumption in the United States, 1917–1926

1917	$1, 024	1922	$2, 753
1918	321	1923	16, 881
1919	691	1924	32, 095
1920	4, 512	1925	64, 570
1921	2, 923	1926	86, 681

Value of roofing slate exported from the United States, 1917–1926

1917	$27, 113	1922	$97, 811
1918	65, 224	1923	78, 780
1919	55, 164	1924	77, 422
1920	122, 105	1925	54, 130
1921	101, 630	1926	53, 117

The following figures for exports of slate other than roofing were collected by the Bureau of Mines from shippers of the products named:

Slate other than roofing exported from the United States, 1924–1926, by uses

Use	1924		1925		1926	
	Quantity	Value	Quantity	Value	Quantity	Value
School slates.....cases [1]	10, 540	$113, 865	11, 050	$111, 271	11, 210	$92, 165
Electrical slate.....square feet	[2] 47, 870	[2] 44, 874	[2] 36, 540	[2] 32, 333	51, 490	56, 042
Blackboards.....do	128, 180	38, 998	149, 470	68, 086	125, 730	47, 520
Billiard tables.....do	4, 340	1, 757	32, 180	16, 167	46, 730	37, 903
Structural.....do	(2)	(2)	(2)	(2)	39, 870	20, 800
Slate granules.....short tons	8, 780	54, 400	15, 550	100, 300	7, 620	46, 000
	----------	253, 894	----------	328, 157	----------	300, 430

[1] Cases weigh from 130 to 165 pounds each; average is 135 pounds.
[2] Small quantity of structural slate included with electrical.

SOAPSTONE

[See Talc and soapstone]

SODIUM SALTS (NATURAL)

In addition to common salt, figures for which are given on page A79, the following quantities of other natural sodium salts (including carbonate, bicarbonate, sulphate, trona, and borate) and colemanite have been shipped by the producers.

Sodium salts (other than NaCl), derived from natural sources in the United States, shipped by producers, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	21, 743	$895, 602	1922	45, 406	$1, 415, 774
1918	24, 053	992, 788	1923	59, 440	1, 775, 940
1919	29, 120	874, 083	1924	76, 420	1, 825, 850
1920	42, 683	1, 513, 179	1925	73, 300	2, 095, 110
1921	25, 000	894, 000	1926	93, 480	2, 326, 750

Borates (colemanite and naturally occurring sodium borate) shipped by producers in the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	108, 875	$3, 609, 632	1922	85, 220	$2, 705, 140
1918	88, 794	2, 263, 230	1923	136, 650	3, 994, 790
1919	66, 146	1, 380, 000	1924	116, 110	3, 183, 910
1920	120, 320	2, 173, 000	1925	113, 700	3, 085, 660
1921	50, 000	1, 600, 000	1926	115, 970	3, 128, 110

STEEL

[See Iron ore, pig iron, and steel]

STONE

Stone sold or used by producers in the United States, 1917–1926, by varieties

Year	Granite		Basalt and related rocks (trap rock)		Sandstone		Marble	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
1917	5, 564, 200	$15, 544, 957	9, 103, 580	$7, 570, 885	3, 880, 500	$5, 512, 421	310, 130	$6, 330, 387
1918	3, 827, 400	14, 466, 423	6, 859, 200	7, 782, 280	2, 858, 100	4, 529, 298	305, 720	5, 496, 389
1919	4, 221, 220	19, 345, 714	7, 410, 770	8, 944, 686	2, 623, 270	5, 283, 842	333, 400	8, 042, 297
1920	4, 760, 000	24, 954, 908	9, 219, 200	12, 260, 148	3, 343, 000	7, 310, 290	431, 500	11, 069, 585
1921	4, 752, 180	20, 592, 217	8, 524, 480	11, 450, 899	2, 640, 460	6, 425, 339	315, 400	8, 580, 416
1922	5, 913, 120	21, 125, 869	10, 032, 900	12, 600, 611	3, 388, 130	7, 521, 044	427, 870	10, 534, 671
1923	7, 300, 130	29, 704, 796	10, 674, 470	13, 539, 648	4, 349, 270	9, 174, 706	562, 560	12, 863, 974
1924	6, 883, 860	28, 772, 161	11, 671, 500	14, 679, 523	3, 894, 690	10, 142, 099	516, 000	13, 302, 235
1925	8, 074, 200	30, 531, 347	11, 842, 110	14, 770, 042	4, 479, 330	10, 920, 016	564, 150	13, 882, 457
1926	9, 330, 390	32, 044, 523	12, 977, 740	15, 950, 302	4, 978, 530	11, 149, 029	563, 170	14, 167, 480

Year	Limestone		Other stone [1]		Total	
	Short tons	Value	Short tons	Value	Short tons	Value
1917	63, 481, 500	$46, 263, 379	1, 234, 990	$993, 642	83, 574, 900	$82, 215, 671
1918	53, 868, 200	49, 453, 006	844, 740	973, 034	68, 563, 360	82, 700, 430
1919	49, 759, 800	53, 171, 701	1, 190, 540	1, 920, 903	65, 539, 000	96, 709, 143
1920	59, 290, 000	75, 655, 260	1, 483, 300	2, 291, 769	78, 527, 000	133, 541, 960
1921	45, 621, 000	57, 749, 594	1, 685, 220	2, 163, 801	63, 538, 740	106, 962, 266
1922	58, 928, 660	68, 397, 927	1, 520, 880	1, 886, 806	80, 211, 560	122, 066, 928
1923	76, 701, 360	89, 620, 007	3, 730, 870	4, 567, 110	103, 318, 660	159, 470, 241
1924	75, 894, 430	89, 868, 956	4, 323, 640	5, 105, 139	103, 184, 120	161, 870, 113
1925	85, 649, 440	98, 008, 028	5, 242, 140	6, 104, 902	115, 851, 370	174, 216, 792
1926	91, 887, 900	109, 252, 299	4, 758, 630	5, 744, 957	124, 496, 360	188, 308, 590

[1] Includes mica schist, conglomerate, argillite, various light-colored volcanic rocks, serpentine not used as marble, and such other stone as can not be properly classed in any of the main groups.

Stone sold or used by producers in the United States, 1925–26, by uses

Use	1925		1926	
	Quantity	Value	Quantity	Value
Building stone ... cubic feet	30, 695, 310	$35, 444, 809	33, 467, 420	$39, 922, 851
Approximate equivalent in short tons	2, 392, 420		2, 609, 190	
Monumental stone ... cubic feet	4, 371, 380	14, 404, 339	4, 335, 770	14, 580, 929
Approximate equivalent in short tons	363, 060		359, 950	
Paving blocks ... number	40, 143, 220	3, 680, 687	39, 563, 180	3, 399, 602
Approximate equivalent in short tons	380, 710		366, 370	
Curbing ... cubic feet	5, 075, 620	4, 313, 446	4, 409, 930	4, 303, 280
Approximate equivalent in short tons	393, 460		346, 020	
Flagging ... cubic feet	762, 280	562, 344	902, 424	657, 435
Approximate equivalent in short tons	55, 790		66, 330	
Rubble ... short tons	1, 197, 170	2, 060, 868	539, 670	917, 433
Riprap ... do	3, 079, 270	2, 794, 379	4, 060, 280	4, 652, 717
Crushed stone ... do	75, 672, 930	80, 508, 429	82, 515, 560	87, 872, 014
Furnace flux (limestone and marble) ... do	22, 860, 890	17, 344, 190	23, 859, 390	18, 049, 012
Refractory stone (ganister, mica schist, and dolomite) ... short tons	1, 261, 130	1, 548, 190	1, 531, 070	1, 925, 832
Manufacturing industries (limestone and marble) ... short tons	5, 171, 520	4, 941, 669	4, 953, 800	4, 376, 026
Other uses (chiefly agricultural limestone) ... do	3, 023, 020	6, 613, 442	3, 288, 730	7, 651, 459
Total (quantities approximate, in short tons)	115, 851, 370	174, 216, 792	124, 496, 360	188, 308, 590

Value of stone imported for consumption in the United States, 1917–1926

Year	Value	Year	Value
1917	$681, 475	1922	$1, 895, 912
1918	268, 577	1923	2, 641, 337
1919	787, 961	1924	2, 437, 654
1920	1, 795, 575	1925	2, 909, 887
1921	1, 253, 959	1926	3, 523, 578

Stone imported for consumption in the United States, 1925–26, by kinds

Kind	1925		1926	
	Quantity	Value	Quantity	Value
Marble, breccia, and onyx:				
In blocks, rough, etc. ......cubic feet	642, 113	$1, 326, 863	863, 219	$1, 783, 767
Sawed ......do	113	576	1, 676	5, 803
Slabs or paving tiles ......superficial feet	671, 561	210, 072	403, 458	222, 230
All other manufactures		257, 382		438, 712
Mosaic cubes of marble or onyx:				
Loose		14, 919		6, 618
Attached to paper		346		410
		1, 810, 158		2, 457, 540
Granite:				
Dressed		359, 364		324, 794
Rough ......cubic feet	213, 594	273, 298	235, 176	287, 116
		632, 662		611, 910
Stone (other):				
Dressed		12, 996		17, 183
Rough (monumental or building stone) ......cubic feet	212, 953	167, 306	256, 950	181, 040
Rough (other)		286, 765		255, 905
		467, 067		454, 128
Grand total		2, 909, 887		3, 523, 578

Value of stone exported from the United States, 1917–1926

Year	Marble in blocks, rough or dressed, and other building or monumental stone[1]	Other manufactures of stone[1]	Total	Year	Marble in blocks, rough or dressed, and other building or monumental stone[1]	Other manufactures of stone[1]	Total
1917	$572, 097	$1, 108, 185	$1, 680, 282	1922	$681, 658	$903, 102	$1, 584, 760
1918	552, 261	1, 208, 164	1, 760, 425	1923	625, 442	783, 195	1, 408, 637
1919	770, 392	1, 508, 997	2, 279, 389	1924	499, 602	448, 731	948, 333
1920	774, 442	2, 158, 764	2, 933, 206	1925	507, 391	725, 677	1, 233, 068
1921	576, 905	1, 697, 570	2, 274, 475	1926	687, 115	896, 130	1, 583, 245

[1] Exports classification beginning 1922; prior to 1922 classification read "Stone including marble—unmanufactured and all other."

STRONTIUM

No domestic production of strontium ore has been reported since 1918 when 400 short tons, valued at $20,000, was mined. Corresponding figures for 1917 are 4,035 tons, valued at $87,700.

Strontium chemicals, manufactured in the United States from domestic and imported crude ore, sold in 1917–1924 [1]

Year	Pounds	Value	Year	Pounds	Value
1917	2, 499, 676	(2)	1921	847, 368	$118, 655
1918	4, 148, 270	$622, 546	1922	2, 040, 550	204, 022
1919	2, 191, 409	402, 057	1923	2, 676, 260	303, 719
1920	4, 713, 015	864, 251	1924	3, 061, 532	303, 456

[1] Canvass discontinued after 1924.

[2] Figures for value not available prior to 1918.

Imports of strontium ore have been as follows: 1926, 2,200 short tons, valued at $58,159; 1925, 1,132 tons, $22,082; 1924, 1,661 tons, $14,487; 1923, 1,679 tons, $12,564. No record of similar imports was kept prior to change in tariff (September 22, 1922), but from that date until the end of the year 1,000 pounds, valued at $40, was imported.

Strontium chemicals and ore imported for consumption in the United States, 1917–1926 [1]

Year	Pounds	Value	Year	Pounds	Value
1917	(2)	$23,216	1922 [1]	390,644	$22,986
1918	(2)	2,459	1923	5,281,818	131,420
1919	1,225,952	3,380	1924	3,993,226	59,937
1920	1,659,083	15,479	1925	4,826,612	162,533
1921	1,212,758	4,393	1926	5,433,044	115,436

[1] Celestite (strontium sulphate ore), strontium nitrate, and some other chemicals not included in record prior to Sept. 22, 1922.

[2] Quantities not recorded prior to July, 1918. During last 6 months of 1918 the imports were 185,920 pounds, valued at $356.

No exports of strontium ore or strontium chemicals have been reported.

SULPHUR

Sulphur produced and shipped in the United States, 1917–1926

Year	Produced (long tons)	Shipped		Year	Produced (long tons)	Shipped	
		Long tons	Approximate value			Long tons	Approximate value
1917	1,134,412	1,120,378	$23,987,000	1922	1,830,942	1,343,624	$22,000,000
1918	1,353,525	1,266,709	27,868,000	1923	2,036,097	1,618,841	26,000,000
1919	1,190,575	678,257	10,252,000	1924	1,220,561	1,537,345	25,000,000
1920	1,255,249	1,517,625	30,000,000	1925	1,409,262	1,858,003	29,000,000
1921	1,879,150	954,344	17,000,000	1926	1,890,027	2,072,657	37,300,000

Sulphur imported into and exported from the United States, 1917–1926

Year	Imports for consumption		Exports	
	Long tons	Value	Long tons	Value
1917	1,015	$29,340	152,736	$3,500,819
1918	82	9,542	131,092	3,626,638
1919	101	8,633	224,712	6,325,552
1920	136	26,828	477,450	8,994,350
1921	50	5,878	285,762	4,524,768
1922	296	14,743	487,969	7,209,357
1923	465	21,535	474,475	7,216,107
1924	1,005	40,293	484,143	7,894,201
1925	100	4,411	632,250	11,153,781
1926	48	1,052	582,324	11,154,540

TALC AND SOAPSTONE

Talc and soapstone sold by producers in the United States, 1917–1926, by classes

Year	Crude		Sawed and manufactured				Ground		Total	
			Talc		Soapstone					
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
1917	12,619	$69,140	5,781	$176,404	19,885	$402,506	180,563	$1,644,828	218,848	$2,292,878
1918	17,633	193,278	1,075	116,952	12,330	501,059	177,269	1,869,730	208,307	2,681,019
1919	15,625	73,437	921	147,339	16,504	530,163	151,793	1,601,736	184,843	2,352,675
1920	11,008	43,820	1,415	139,335	19,707	709,400	178,505	2,142,894	210,635	3,035,449
1921	2,150	12,911	(1)	(1)	[1] 17,423	[1] 627,826	102,413	1,115,205	121,986	1,755,942
1922	4,981	22,582	654	86,333	22,700	712,144	170,349	2,038,838	198,684	2,859,897
1923	5,706	50,125	682	114,772	22,857	932,098	167,447	1,915,258	196,692	3,012,253
1924	5,710	22,247	846	109,405	25,630	1,288,885	171,635	2,095,019	203,821	3,515,556
1925 [2]	5,684	24,533	895	107,691	(3)	(3)	175,677	1,879,569	182,256	2,011,793
1926 [2]	5,988	26,723	1,528	130,253	(3)	(3)	174,052	1,954,018	181,568	2,110,994

[1] Talc included under "Soapstone."
[2] Figures represent talc only.
[3] Bureau of Mines not at liberty to publish figures for soapstone.

Talc imported for consumption in the United States, 1917–1926

Year	Crude and unground steatite and French chalk		Manufactures (except toilet preparations) wholly or partly finished [1]		Total	
	Short tons	Value	Short tons	Value	Short tons	Value
1917	2,452	$10,710	16,157	$258,787	18,609	$269,497
1918	1,434	9,253	12,735	251,323	14,169	260,576
1919	1,641	10,105	12,961	248,899	14,602	259,004
1920	941	7,206	21,739	443,514	22,680	450,720
1921	153	2,279	11,468	239,469	11,621	241,748
1922	248	9,850	18,196	367,528	18,444	377,378
1923	560	20,653	19,405	402,238	19,965	422,891
1924	313	4,847	17,496	337,508	17,809	342,355
1925	121	6,547	20,872	443,985	20,993	450,532
1926	199	16,366	23,642	523,716	23,841	540,082

[1] Prior to change in tariff Sept. 22, 1922, the classification was "Talc, steatite, and French chalk—cut, ground, or washed."

No material that might be classed as soapstone is imported.

Exports of "talcum and other toilet powders" have been as follows: 1926, 1,645 short tons, valued at $1,726,933; 1925, 1,734 tons, $1,882,196; 1924, 1,614 tons, $1,688,211; 1923, 1,907 tons, $1,671,588; 1922, 1,821 tons, $1,397,542. Exports were not separately classified prior to 1922.

TANTALUM

Columbite, mined in the United States, shipped in 1918–1926 [1]

Year	Pounds	Value	Year	Pounds	Value
1918	4,500	$2,250	1923	1,350	$540
1919	300	90	1924	1,197	598
1920	4,000	1,450	1925	-----------	-----------
1921	3,400	1,150	1926	2,100	650
1922	600	240			

[1] For several years prior to 1918 there was no market for tantalum or columbium minerals, and they were therefore not produced

No imports of tantalum or tantalum ores were recorded for 1917 to 1919, 1922, or 1924. For other years in the decade 1917 to 1926 imports have been recorded as follows: 1920, 60 pounds of "ferroalloys (tantalum)," valued at $54; 1921, 1,229 pounds of "ferroalloys (tantalum)," $788, and 6,785 pounds of "steel-hardening ores (tantalum)," $1,327. Beginning with 1923 the classification is "Ores of ferroalloying metals (tantalum)" and the figures are as follows: 1923, 5,600 pounds, $3,031; 1925, 5,022 pounds, $1,347; 1926, 350 pounds, $149.

No separate record of exports is kept.

TELLURIUM

Tellurium is a by-product of the electrolytic refining of copper. In 1926 tellurium was produced by 3 companies and sales amounted to 1,106 pounds, valued at $2,229. Figures of production for earlier years are not available for publication.

Imports and exports of tellurium are not reported.

THORIUM MINERALS

In 1925, 2,000 pounds of monazite, estimated to contain 6 per cent of thoria, was shipped from Florida. The value of this monazite is estimated by the Bureau of Mines as $120. No monazite is known to have been produced in the United States from 1918 to 1924, or in 1926. Production in 1917 was 22,000 pounds, valued at $1,760.

Monazite sand and thorium nitrate imported for consumption in the United States, 1917–1926

Year	Monazite sand		Thorium nitrate	
	Pounds	Value	Pounds	Value [1]
1917	5,828,270	$355,017	1,188	$2,359
1918	2,994,515	204,661		
1919	632,568	48,768	3,307	5,250
1920	1,814,183	141,528	35,640	43,221
1921	50	40	44,554	89,672
1922	3,466,844	210,187	43,254	42,096
1923	253,730	11,334	24,027	29,789
1924	546,560	18,320	14,150	13,721
1925			21,519	22,661
1926	669,760	23,816	21,403	27,955

Exports of thorium nitrate in 1922 amounted to 1,103 pounds, valued at $3,149. Data for other years are not separately shown.

TIN

Tin mined in the United States (including Alaska), 1917–1926

[Metallic tin obtainable from concentrates produced in tin mining]

Year	Short tons	Value [1]	Year	Short tons	Value [1]
1917	110	$135,600	1922	[2] 1	$912
1918	69	118,500	1923	2	1,623
1919	56	73,400	1924	7	7,028
1920	22	22,000	1925	14	15,980
1921	4	2,400	1926	8	10,400

[1] Value calculated at average price per pound of Straits tin in New York, as published by American Metal Market.

[2] 2,800 pounds.

Smelter production of metallic tin in the United States, 1917–1926, in short tons

1917	6, 065	1922	9, 108
1918	10, 284	1923	7, 466
1919	12, 236	1924	486
1920	17, 652	1925–26	------
1921	11, 542		

Secondary tin recovered as metal and in alloys and chemical compounds in the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	19, 400	$23, 920, 200	1922	19, 510	$12, 443, 500
1918	23, 837	41, 381, 000	1923	30, 210	25, 316, 000
1919	24, 033	29, 868, 200	1924	31, 300	31, 062, 100
1920	23, 500	22, 705, 700	1925	30, 950	35, 165, 400
1921	16, 900	9, 668, 500	1926	33, 400	42, 511, 500

Metallic tin imported for consumption in the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	72, 166	$63, 860, 340	1922	67, 416	$40, 797, 986
1918	71, 254	93, 144, 218	1923	77, 206	61, 092, 354
1919	44, 849	50, 890, 019	1924	72, 866	68, 953, 193
1920	62, 795	73, 440, 872	1925	85, 843	95, 121, 111
1921	27, 101	16, 645, 719	1926	86, 418	104, 793, 396

Tin ore (concentrate) imported into the United States, 1917–1926

[General imports]

Year	Short tons	Value	Year	Short tons	Value
1917	9, 054	$4, 743, 099	1922	13, 804	$5, 504, 434
1918	18, 394	11, 444, 401	1923	3, 015	2, 169, 055
1919	19, 196	11, 871, 948	1924	[1] 174	71, 094
1920	34, 148	18, 795, 162	1925	[1] 214	98, 489
1921	15, 340	5, 672, 861	1926	[1] 339	187, 396

[1] Recorded as tin content.

Exports of tin ore are insignificant.

Metallic tin (pigs, bars, etc.) of domestic manufacture exported from the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	206	$232, 401	1922	901	$574, 792
1918	20	31, 952	1923	840	646, 250
1919	306	415, 921	1924	469	453, 482
1920	706	770, 375	1925	404	445, 782
1921	1, 154	748, 077	1926	756	708, 151

TITANIUM MINERALS

Titanium minerals produced in the United States, 1917–1926

Year	Rutile concentrates			Ilmenite concentrates		
	Short tons	Percentage of TiO_2	Value	Short tons	Percentage of TiO_2	Value
1917	206	93	$32, 960	1, 339	53–55	$12, 677
1918	261	95	39, 150	1, 644	53–55	18, 600
1919 [1]	102	94–96	20, 400	106	48–50	2, 120
1920	277	94–96	(2)	268	50	(2)
1921	-----	-----	-----	-----	-----	-----
1922	310	95	(2)	5, 181	52–54	(2)
1923	270	95	(2)	6, 270	52	(2)
1924	-----	-----	-----	4, 769	52	[3] 76, 300
1925	46	95	[3] 11, 000	5, 566	52	[3] 89, 000
1926 [4]	30	95	[3] 7, 500	4, 813	52	[3] 77, 000

[1] Virginia production only; information regarding Florida not available for publication.
[2] Bureau of Mines not at liberty to publish value.
[3] Estimate by Bureau of Mines.
[4] Figures for Florida only. Bureau of Mines not at liberty to publish figures for Virginia.

No imports of titanium or "titanium steel-hardening" ores have been recorded since 1918, although ilmenite is known to have been imported from Senegal, West Africa, and probably from other places. Such imports are not separately classified by the Bureau of Foreign and Domestic Commerce. Imports of "titanium steel-hardening" ores during last six months of 1918 were 1,606 pounds, valued at $221. No separate record of similar imports was kept prior to July, 1918. Imports of "titanium potassium oxalate and all compounds and mixtures containing titanium" amounted to 81,604 pounds, valued at $12,232, in 1926; to 81,721 pounds, $12,368, in 1925; to 24,134 pounds, $3,639, in 1924; to 39,763 pounds, $6,423, in 1923; and to 82,544 pounds, $20,596, from September 22 to December 31, 1922. Similar imports were not separately classified prior to change in tariff. For imports of ferrotitanium see under Ferro-alloys.

No separate record of exports of titanium, "titanium steel-hardening" ores, or ferrotitanium is kept.

TRIPOLI

[See Abrasive materials]

TUNGSTEN

Concentrated tungsten ores (carrying 60 per cent of tungsten trioxide), produced in the United States, sold in 1917–1926, and average value per unit

Year	Short tons	Value		Year	Short tons	Value	
		Total	Average per unit			Total	Average per unit
1917	6, 144	$6, 783, 000	$18. 40	1922	-----	-----	-----
1918	5, 061	7, 049, 300	23. 24	1923	241	$144, 600	$10. 00
1919	327	353, 900	18. 02	1924	565	287, 000	8. 47
1920	216	101, 800	7. 86	1925	1, 191	755, 500	10. 57
1921	-----	-----	-----	1926	1, 382	920, 400	11. 10

Tungsten-bearing ores[1] imported for consumption in the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	4,876	$4,465,590	1922	1,651	$279,190
1918	11,750	11,552,218	1923		
1919	9,408	6,261,190	1924		
1920	1,949	779,593	1925	427	206,326
1921	1,614	276,757	1926	1,267	566,996

[1] Prior to Sept. 22, 1922, imports recorded as ore; beginning with change in tariff, recorded as tungsten content of ore.

For imports of tungsten and ferrotungsten see under Ferro-alloys.

For 1922 the following domestic exports are recorded: "Tungsten ores and concentrates (tungsten content)," 717 pounds, valued at $594. No tungsten ores of domestic production are recorded as exported in 1917 to 1921, and, although exports for later years are not separately shown, it is practically certain that no domestic ores have been exported.

For exports of tungsten and ferrotungsten see under Ferro-alloys.

URANIUM AND VANADIUM ORES

The market for radium has been so overshadowed by the uranium deposits of Katanga, Belgian Congo, that only one company was able to isolate radium in the United States in 1924 and 1925. In 1926 only such radium was isolated as was obtained in cleaning up the ore left over and the residues of the plant. Some uranium ore was produced in Utah in 1926 for various firms using the ore in medicinal preparations but the bulk of the ore produced from the radium fields of Colorado, Utah, and Arizona was for vanadium only.

Uranium and vanadium ores shipped from mines in the United States, 1917–1926

Year	Ores		Radium isolated (grams)	Estimated content of ores		
	Short tons	Approximate value as ore		Radium (grams)	Uranium (short tons)	Vanadium (short tons)
1917	33,404	$617,000	11.96	26.4	87.4	484
1918	18,860	957,000	21.7	27.1	89.5	276
1919	14,509	1,630,900	28.648	29.0	95.7	284.2
1920	35,076	2,401,000	32.539	43.4	143.5	526.7
1921	8,540	876,000	35.693	33.0	109.0	201.5
1922	929	166,016	24.189	7.0	23.2	25.9
1923	2,025	150,000	12.212	5.5	18.2	63.3
1924	(1)	(1)	(1)	(1)	(1)	(1)
1925	13,070	331,000	(1)	4.3	14.3	216
1926	21,624	329,000	(1)	.4	1.2	330.7

[1] Bureau of Mines not at liberty to publish figures.

Value of uranium salts and oxide, including radium salts, imported for consumption in the United States, 1917–1926

1917	$2,930	1922	$28,685
1918	274	1923	500,456
1919	12,960	1924	418,307
1920	3	1925	480,889
1921	8,552	1926	596,433

No imports of "uranium-radium ore (steel-hardening)" were recorded for 1922 to 1926 and for 1919. Imports in 1920 and 1921 were 396 pounds, $1,110, and 250 pounds, $446, respectively. Similar imports were not recorded separately prior to July 1, 1918, but from that date to the end of the year 157 pounds, valued at $4,840, was imported.

Vanadium ore (steel-hardening) imported for consumption in the United States, 1918–1926

Year	Short tons	Value	Year	Short tons	Value
1918—July to December [1]	886	$5, 333	1923	2, 089	$229, 210
1919	3, 013	67, 846	1924	7, 058	722, 731
1920	10, 337	1, 080, 935	1925	2, 368	339, 468
1921	5, 154	543, 061	1926	8, 368	914, 114
1922	306	86, 776			

[1] Not separately classified prior to July, 1918.

For imports of ferrovanadium see under Ferro-alloys.

No separate record is kept of vanadium exports. For exports of ferrovanadium see under Ferro-alloys.

ZINC [1]

Primary zinc produced in the United States from domestic ores, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	584, 597	$119, 258, 000	1922	353, 274	$40, 273, 000
1918	492, 405	89, 618, 000	1923	508, 335	69, 134, 000
1919	452, 272	66, 032, 000	1924	515, 831	67, 058, 000
1920	450, 045	72, 907, 000	1925	555, 631	84, 456, 000
1921	198, 232	19, 823, 000	1926	611, 991	91, 799, 000

[1] For prices of zinc, see statement on p. A12.

Primary zinc produced in the United States, 1922–1926, by sources of ore, in short tons

Source	1922	1923	1924	1925	1926
United States	353, 274	508, 335	515, 831	555, 631	611, 991
Foreign:					
Canada	55	----------	1, 396	7, 997	----------
Mexico	948	2, 099	112	9, 318	6, 431
Total foreign	1, 003	2, 099	1, 508	17, 315	6, 431
Grand total	354, 277	510, 434	517, 339	572, 946	618, 422

Primary zinc produced in the United States, 1922–1926, by localities in which reduced, in short tons

Location of reduction plant	1922	1923	1924	1925	1926
Arkansas	13, 627	29, 870	28, 447	27, 145	32, 712
Illinois	76, 266	93, 239	93, 370	109, 672	110, 381
Kansas	24, 167	32, 006	28, 640	25, 765	33, 671
Oklahoma	74, 537	119, 744	118, 487	138, 906	136, 560
Pennsylvania	57, 319	82, 003	83, 016	99, 899	100, 538
Other States	108, 361	153, 572	165, 379	171, 559	204, 560
	354, 277	510, 434	517, 339	572, 946	618, 422

Secondary zinc recovered as metal in the United States, 1917–1926, in short tons

Year	Redistilled	Remelted	Recovered in alloys, excluding old brass remelted	Recovered in remelted brass (estimate)
1917	16, 835	14, 565	4, 800	80, 000
1918	9, 918	17, 190	11, 082	82, 400
1919	19, 748	20, 162	6, 062	62, 400
1920	21, 371	21, 479	7, 650	65, 000
1921	17, 573	16, 260	5, 840	38, 600
1922	32, 988	36, 326	10, 250	60, 000
1923	39, 434	25, 776	8, 630	65, 000
1924	35, 486	23, 400	10, 500	63, 000
1925	39, 181	22, 249	13, 300	53, 300
1926	40, 799	23, 771	13, 430	63, 000

Zinc imported for consumption in the United States, 1917–1926

Year	Blocks or pigs		Sheets		Old		Zinc dust		Manufactures	Total value
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value		
1917	18	$2, 279	73	$16, 570	259	$25, 974	233	$48, 604	$250	$93, 677
1918	11	2, 897	(1)	29	24	2, 056	16	3, 552	331	8, 865
1919	32	2, 284	1	249	37	2, 216	52	5, 753	1, 258	11, 760
1920	(1)	17	4	614	14	1, 065	17	6, 207	1, 746	9, 649
1921	6, 598	559, 870	6, 688	496, 445	6	341	42	1, 121	8, 290	1, 066, 067
1922	40	3, 327	416	59, 037	46	2, 403	79	5, 614	9, 517	79, 898
1923	1	375	(1)	41	20	1, 624	4	891	16, 331	19, 262
1924	11	1, 973	(1)	88	14	1, 493	59	9, 241	20, 089	32, 884
1925	(1)	303	(1)	55	24	2, 495	116	20, 936	18, 979	42, 768
1926	(1)	195	(1)	46	21	1, 315	2	451	44, 574	46, 581

[1] Less than 1 ton.

Zinc content of zinc ores [1] imported for consumption in the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	33, 517	$1, 123, 534	1922	[2] 1, 895	$18, 903
1918	8, 501	291, 449	1923	[2] 2, 007	273, 105
1919	2, 978	119, 540	1924	[2] 332	32, 850
1920	6, 971	198, 156	1925	[2] 57	6, 205
1921	9, 387	252, 951	1926	[2] 55	4, 181

[1] Classification as follows: 1917–1922, "Ore, zinc-bearing, including calamine (zinc content)"; 1923–1926, "Zinc ores (zinc content)."

[2] Content of ore imported duty free and containing less than 10 per cent of zinc is separately recorded after Sept. 21, 1922, but is excluded from figures as zinc content is not recovered.

Zinc exported from the United States, 1917–1926

Year	Domestic				Foreign slabs	
	Slabs		Sheets			
	Short tons	Value	Short tons	Value	Short tons	Value
1917	137, 282	$32, 605, 767	16, 514	$5, 730, 792	64, 680	$12, 429, 356
1918	66, 369	12, 469, 622	13, 875	4, 566, 756	20, 069	3, 565, 127
1919	109, 746	17, 524, 153	19, 762	5, 212, 002	12, 256	1, 943, 507
1920	74, 046	12, 495, 144	11, 852	2, 832, 993	28, 132	4, 331, 636
1921	1, 753	204, 984	1, 816	425, 618	1, 256	100, 677
1922	26, 815	2, 994, 625	3, 217	574, 491	3, 471	429, 122
1923	42, 131	5, 961, 525	3, 732	764, 369	7, 080	941, 257
1924	[1] 72, 583	[1] 9, 538, 459	3, 658	784, 728	(1)	(1)
1925	[1] 76, 351	[1] 11, 654, 441	4, 196	926, 841	(1)	(1)
1926	[1] 42, 920	[1] 6, 360, 671	4, 641	1, 086, 967	(1)	(1)

[1] Foreign included with domestic. Not separately recorded after 1923.

ZINC RESIDUUM

[See Manganiferous zinc residuum]

ZIRCONIUM MINERALS

The Bureau of Mines is advised that shipments of zircon from Pablo Beach, Fla., have been as follows: 1926, 1,292 short tons; 1925, 624 tons; 1924, 281 tons; 1923, 153 tons; and 1922, 10 tons. The bureau estimates the value as $180,880, $87,360, $39,340, $21,420, and $1,150, respectively. No shipments were reported for 1917 to 1921. Brazil is the world's main producer of zirconium ores. The zirconium minerals produced in Brazil and exported consist of the silicate, zircon, and the oxide, baddeleyite.

Zirconium ores (steel-hardening) imported for consumption in the United States, 1918–1926

Year	Pounds	Value	Year	Pounds	Value
1918—July to December [1]	3,216,659	$77,250	1923	----------	----------
1919	11,023	332	1924	616,220	$4,878
1920	----------	----------	1925	----------	----------
1921	131,016	3,003	1926	----------	----------
1922	67,037	4,072			

[1] Not separately classified prior to July 1918.

STATE TABLES

Mineral production of Alabama in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Asphalt (native) ... short tons	23, 550	$77, 080	22, 000	$101, 000
Cement ... barrels	[1] 6, 045, 967	[1] 9, 824, 439	[1] 6, 693, 900	[1] 10, 825, 421
Clay products		[2] 4, 987, 896		[2] 5, 181, 571
Clay, raw ... short tons	107, 340	[3] 169, 311	110, 007	[3] 171, 424
Coal ... do	20, 004, 395	42, 442, 000	21, 000, 962	48, 036, 000
Coke ... do	4, 670, 481	[3] 16, 801, 841	[4] 4, 779, 986	[3] [4] 16, 823, 492
Ferro-alloys ... long tons	(3 5)	(3 5)	(3 5)	(3 5)
Graphite, crystalline ... pounds	(5)	(5)	(5)	(5)
Iron ore ... long tons	6, 891, 081	14, 134, 677	6, 871, 412	13, 846, 656
Iron, pig ... do	2, 910, 370	[3] 57, 777, 275	2, 875, 534	[3] 58, 119, 260
Lime ... short tons	207, 699	1, 679, 155	220, 732	1, 721, 558
Manganese ore ... long tons	938	12, 544	896	(5)
Manganiferous ore ... do	298	3, 087	1, 018	6, 421
Mica:				
Scrap ... short tons	(5)	(5)		
Sheet ... pounds	(5)	(5)		
Mineral waters ... gallons sold	(6)	(6)	(6)	(6)
Sand and gravel ... short tons	2, 683, 042	1, 244, 398	2, 417, 161	1, 245, 210
Stone ... do	1, 392, 790	2, 142, 595	1, 296, 440	2, 018, 193
Miscellaneous [7]		2, 452, 235		2, 951, 871
Total value, eliminating duplications		77, 139, 340		83, 709, 894

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[1] Exclusive of puzzolan, value for which is included under "Miscellaneous."
[2] Figures obtained through cooperation with Bureau of the Census.
[3] Value not included in total value for State.
[4] Exclusive of beehive coke, value for which is included under "Miscellaneous," but not in total value for State.
[5] Value included under "Miscellaneous."
[6] No canvass.
[7] Includes minerals indicated by "1," "4," and "5" above.

Mineral production of Alaska in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Coal ... short tons	82, 868	$405, 000	87, 300	$459, 000
Copper ... pounds	73, 855, 298	10, 487, 452	67, 778, 000	9, 488, 920
Gold ... troy ounces	307, 679	6, 360, 281	324. 451	6, 707, 000
Lead ... short tons	789	137, 286	778	124, 480
Mercury ... flasks			(1)	(1)
Natural gas ... M cubic feet	(1)	(1)	(1)	(1)
Natural-gas gasoline ... gallons	33, 000	5, 000	33, 000	4, 000
Ores (crude), etc.:				
Copper ... short tons	860, 023	(2)	670, 000	(2)
Dry and siliceous (gold and silver) ... do	3, 573, 540	(2)	3, 924, 925	(2)
Lead ... do	247	(2)	427	(2)
Petroleum ... barrels	8, 000	34, 000	7, 600	9, 600
Platinum and allied metals ... troy ounces	2, 862	224, 570	3, 331	233, 211
Silver ... do	698, 259	484, 592	690, 000	430, 560
Stone ... short tons	(1)	(1)	(1)	(1)
Tin (metallic equivalent) ... do	14	15, 980	8	10, 400
Miscellaneous [3]		132, 159		139, 719
Total value, eliminating duplications		18, 286, 320		17, 606, 890

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[1] Value included under "Miscellaneous."
[2] Not valued as ore; value of recoverable metal content included under the metals.
[3] Includes minerals indicated by "1" above.

Mineral production of Arizona in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Asbestos ---- short tons	(1)	(1)	(1)	(1)
Barite ---- do	(1)	(1)	(1)	(1)
Clay products		[2] $181, 358		[2] $197, 037
Clay, raw ---- short tons	(1 3)	(1 3)	(1 3)	(1 3)
Coal ---- do			624	1, 000
Copper ---- pounds	713, 355, 129	101, 296, 428	723, 296, 051	101, 261, 447
Feldspar (crude) ---- long tons	(1)	(1)	(1)	(1)
Gems and precious stones		(4)		(4)
Gold ---- troy ounces	201, 741	4, 170, 355	234, 011	4, 837, 436
Gypsum ---- short tons	(1)	(1)	(1)	(1)
Lead ---- do	11, 938	2, 077, 213	11, 629	1, 860, 662
Lime ---- do	39, 045	394, 023	42, 757	421, 549
Manganese ore ---- long tons	294	5, 102	2, 684	(1)
Manganiferous ore ---- do			46	(1)
Mercury ---- flasks	30	(1)	(1)	(1)
Ores (crude), etc.:				
Copper ---- short tons	20, 634, 428	(5)	22, 031, 292	(5)
Copper-lead ---- do	24, 565	(5)	25, 020	(5)
Dry and siliceous (gold and silver) ---- do	124, 990	(5)	139, 949	(5)
Lead ---- do	127, 944	(5)	157, 854	(5)
Lead-zinc ---- do	15, 150	(5)	22, 037	(5)
Zinc ---- do	305	(5)	6, 533	(5)
Pumice ---- do			15	150
Pyrite (radio crystals) ---- pounds	(1)	(1)		
Sand and gravel ---- short tons	(1)	(1)	392, 351	113, 906
Silver ---- troy ounces	7, 257, 868	5, 036, 961	7, 381, 027	4, 605, 761
Sodium sulphate from natural sources ---- short tons	(1)	(1)	(1)	(1)
Stone ---- do	435, 060	306, 763	685, 970	397, 632
Sulphuric acid (60° Baumé) [6] ---- do	10, 602	(1 3)	29, 367	(1 3)
Tungsten ore (60 per cent concentrates) ---- do	9	5, 200	25	15, 000
Uranium and vanadium ores ---- do			(1)	(1)
Zinc ---- do	3, 666	557, 241	6, 473	970, 982
Miscellaneous [7]		263, 543		571, 287
Total value, eliminating duplications		114, 202, 670		115, 047, 987

[1] Value included under "Miscellaneous."
[2] Figures obtained through cooperation with Bureau of the Census.
[3] Value not included in total value for State.
[4] No canvass.
[5] Not valued as ore; value of recoverable metal content included under the metals.
[6] From copper smelting.
[7] Includes minerals indicated by "1" above.

Mineral production of Arkansas in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Antimony ore ---- short tons	(1)	(1)		
Bauxite ---- long tons	296, 320	$1, 878, 450	371, 570	$2, 298, 550
Clay products		[2 3] 1, 689, 611		[2 3] 1, 544, 771
Clay, raw ---- short tons	623	[4] 2, 634	442	[4] 2, 106
Coal ---- do	1, 220, 039	4, 829, 000	1, 459, 017	5, 497, 000
Gems and precious stones		(5)		(5)
Iron ore sold for magnets ---- long tons	4	(1)	10	(1)
Lead ---- short tons	58	10, 092	18	2, 880
Lime ---- do	24, 791	223, 965	31, 346	275, 935
Manganese ore ---- long tons	3, 517	79, 335	2, 450	64, 010
Manganiferous ore ---- do	5, 076	23, 140	8, 195	47, 428
Mineral waters ---- gallons sold	(5)	(5)	(5)	(5)
Natural gas ---- M cubic feet	41, 878, 000	5, 394, 000	43, 566, 000	5, 817, 000
Natural-gas gasoline ---- gallons	19, 686, 000	2, 420, 000	30, 385, 000	2, 867, 000
Oilstones and scythestones ---- short tons	255	165, 018	158	106, 317
Ores (lead and zinc) ---- do	(6)	(6)	(6)	(6)
Petroleum ---- barrels	77, 398, 000	68, 880, 000	58, 332, 000	64, 600, 000
Sand and gravel ---- short tons	2, 059, 893	1, 078, 303	1, 529, 484	847, 579
Silver ---- troy ounces	3, 118	2, 164		
Slate				(1)
Stone ---- short tons	374, 940	448, 313	388, 200	435, 108
Zinc ---- do	43	6, 536	87	13, 050
Miscellaneous [7]		57, 605		69, 044
Total value, eliminating duplications		87, 185, 532		84, 485, 672

[1] Value included under "Miscellaneous.
[2] Figures obtained through cooperation with Bureau of the Census.
[3] Exclusive of pottery, value for which is included under "Miscellaneous."
[4] Value not included in total value for State.
[5] No canvass.
[6] Figures not available.
[7] Includes minerals indicated by "1" and "3", above

Mineral production of California in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Asbestos short tons	(1)	(1)		
Asphalt (native) do	2,680	$16,100	3,330	$19,310
Barite do			(1)	(1)
Borates do	(1)	(1)	84,490	2,796,700
Briquets, fuel do	(1 2)	(1 2)	(1 2)	(1 2)
Bromine pounds			(3)	(3)
Calcium chloride short tons	(1)	(1)	(1)	(1)
Cement barrels	13,109,426	26,159,531	13,660,078	25,299,245
Chromite long tons	83	1,650	91	979
Clay products		[4] 21,324,844		[4] 20,569,492
Clay, raw short tons	293,794	[2] 707,908	297,329	[2] 804,978
Coal do	(1)	(1)	(1)	(1)
Copper pounds	46,864,913	6,654,818	33,466,299	4,685,282
Diatomite short tons	71,074	877,503	(1)	(1)
Feldspar (crude) long tons	6,077	49,881	6,271	49,300
Fuller's earth short tons	(1)	(1)	(1)	(1)
Gems and precious stones		(5)		(5)
Gold troy ounces	632,035	13,065,330	576,798	11,923,481
Gypsum short tons	(1)	(1)	(1)	(1)
Iron ore long tons	352	(1)	282	(1)
Lead short tons	3,283	571,259	4,047	647,481
Lime do	70,805	745,132	67,421	800,089
Lithium minerals do			(1)	(1)
Magnesite do	64,600	872,100	53,940	604,130
Magnesium chloride (natural) pounds	9,207,200	126,750	12,277,000	105,480
Magnesium sulphate (natural) do	(1)	(1)	(1)	(1)
Manganese ore long tons	869	17,525	393	8,750
Marl, calcareous short tons	(1)	(1)	8,346	27,924
Mercury flasks	7,614	632,936	5,726	526,237
Mineral waters gallons sold	(5)	(5)	(5)	(5)
Natural gas M cubic feet	187,789,000	32,587,000	204,915,000	35,495,000
Natural-gas gasoline gallons	303,180,000	32,743,000	389,366,000	[6] 45,945,000
Ores (crude), etc.:				
Copper short tons	999,006	(7)	930,464	(7)
Copper-lead do			383	(7)
Dry and siliceous (gold and silver) do	886,625	(7)	717,326	(7)
Lead do	18,208	(7)	30,445	(7)
Lead-zinc do	1,456	(7)	25,162	(7)
Zinc do	33,384	(7)	57,079	(7)
Peat do	5,325	49,066	6,065	56,192
Pebbles for grinding do	215	1,385	102	612
Petroleum barrels	232,492,000	330,610,000	224,673,000	345,547,000
Platinum and allied metals troy ounces	105	14,446	95	11,402
Potassium salts short tons	(1)	(1)	(1)	(1)
Pumice do	(1)	(1)	320	9,600
Pyrites long tons	(1)	(1)	(1)	(1)
Salt short tons	292,480	1,420,924	288,440	1,397,587
Sand and gravel do	14,077,849	8,752,528	13,164,670	8,820,047
Sand-lime brick thousands	(1 4)	(1 4)	(1 4)	(1 4)
Shale oil gallons	(8)	(9)	(8)	(9)
Silica (quartz) short tons	5,602	40,773	8,902	103,016
Silver troy ounces	3,054,416	2,119,765	2,022,460	1,262,015
Slate				2,976
Sodium salts (carbonate, bicarbonate, sulphate, and trona) from natural sources short tons	48,830	951,640	56,680	1,153,860
Stone do	9,096,170	10,341,815	9,248,240	10,546,571
Talc and soapstone do	14,883	194,975	15,419	233,292
Tungsten ore (60 per cent concentrates) do	(1)	(1)	490	358,600
Zinc do	5,745	873,182	10,217	1,532,542
Miscellaneous [10]		5,188,658		2,903,855
Total value, eliminating duplications		496,923,376		523,352,257

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[1] Value included under "Miscellaneous."
[2] Value not included in total value for State.
[3] Figures not available.
[4] Figures obtained through cooperation with Bureau of the Census.
[5] No canvass.
[6] Value estimated by the Bureau of Mines.
[7] Not valued as ore; value of recoverable metal content included under the metals.
[8] Bureau of Mines not at liberty to publish figures.
[9] No data available.
[10] Includes minerals indicated by "1" above.

Mineral production of Colorado in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Cement ... barrels	(1)	(1)	(1)	(1)
Clay products		[2] $4,126,945		[2] $3,381,776
Clay, raw ... short tons	254,521	[3] 358,687	199,867	[3] 254,523
Coal ... do	10,310,551	30,322,000	10,637,225	29,529,000
Coke ... do	644,481	(1 3)	790,118	(1 3)
Copper ... pounds	2,360,500	335,191	3,403,850	476,539
Feldspar (crude) ... long tons	(1)	(1)	(1)	(1)
Ferro-alloys ... do	(1 3)	(1 3)		
Fluorspar ... short tons	11,776	153,707	10,440	(1)
Gems and precious stones		(4)		(4)
Gold ... troy ounces	349,607	7,227,022	342,400	7,078,033
Gypsum ... short tons	(1)	(1)	(1)	(1)
Iron ore ... long tons	8,642	(1)	35,535	(1)
Iron, pig ... do	(1 3)	(1 3)	(1 3)	(1 3)
Lead ... short tons	31,483	5,478,042	34,494	5,519,024
Lime ... do	(1)	(1)	12,470	127,975
Manganese ore ... long tons	743	5,127		
Manganiferous ore:				
For fluxing ... do	11,366	16,749	6,656	9,208
For other purposes ... do	7,352	26,565	2,925	(1)
Mica, scrap ... short tons	(1)	(1)	(1)	(1)
Mineral paints, zinc and lead pigments ... do	16,301	[3] 2,007,495	13,751	[3] 1,713,362
Mineral waters ... gallons sold	(4)	(4)	(4)	(4)
Molybdenum ... pounds	(1)	(1)	(1)	(1)
Natural gas ... M cubic feet	574,400	61,100	553,800	130,000
Natural-gas gasoline ... gallons	35,000	4,000	276,000	17,000
Ores (crude), etc.:				
Copper ... short tons	2,193	(5)	2,126	(5)
Copper-lead ... do	1,417	(5)	97	(5)
Dry and siliceous (gold and silver) ... do	1,187,054	(5)	1,240,195	(5)
Lead ... do	95,113	(5)	93,531	(5)
Lead-zinc ... do	448,096	(5)	495,507	(5)
Zinc ... do	11,801	(5)	8,284	(5)
Petroleum ... barrels	1,226,000	1,810,000	2,768,000	5,100,000
Pyrite (radio crystals) ... pounds	15	15		
Sand and gravel ... short tons	692,395	547,944	764,523	590,695
Shale oil ... gallons			3,360	(6)
Silver ... troy ounces	4,506,940	3,127,816	4,704,122	2,935,372
Stone ... short tons	[7] 674,610	[7] 881,756	911,450	1,107,867
Tungsten ore (60 per cent concentrates) ... do	201	(1)	232	148,200
Uranium and vanadium ores ... do	(1)	(1)	20,511	292,000
Zinc ... do	30,811	4,683,196	32,500	4,875,000
Miscellaneous [8]		15,639,664		15,439,688
Total value, eliminating duplications		63,512,998		65,597,487

[1] Value included under "Miscellaneous."
[2] Figures obtained through cooperation with Bureau of the Census.
[3] Value not included in total value for State.
[4] No canvass.
[5] Not valued as ore; value of recoverable metal content included under the metals.
[6] No data available.
[7] Exclusive of basalt and marble, value for which is included under "Miscellaneous."
[8] Includes minerals indicated by "1" and "7" above.

Mineral production of Connecticut in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Clay products		[1] [2] $2,509,727		[1] [2] $3,291,298
Clay, raw....short tons	416	[3] 6,503	794	[3] 9,491
Feldspar (crude)....long tons	10,426	71,201	11,436	87,844
Lime....short tons	58,449	672,821	61,742	695,495
Mica:				
Scrap....do	(4)	(4)		
Sheet....pounds	(4)	(4)	(4)	(4)
Mineral waters....gallons sold	(5)	(5)	(5)	(5)
Sand and gravel....short tons	1,065,132	463,807	1,059,556	451,069
Sand-lime brick....thousands	(1 4)	(1 4)	(1 4)	(1 4)
Silica (quartz)....short tons	595	3,960	246	1,678
Stone....do	1,830,210	2,655,339	[6] 2,069,920	[6] 2,680,849
Miscellaneous [7]		378,599		487,108
Total value, eliminating duplications		6,755,454		7,695,341

[1] Figures obtained through cooperation with Bureau of the Census.
[2] Exclusive of pottery, value for which is included under "Miscellaneous."
[3] Value not included in total value for State.
[4] Value included under "Miscellaneous."
[5] No canvass.
[6] Exclusive of limestone, value for which is included under "Miscellaneous."
[7] Includes mineral indicated by "2", "4", and "6" above.

Mineral production of Delaware in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Clay products		[1] $271,701		[1] $156,897
Clay, raw....short tons	5,583	[2] 65,705	7,237	[2] 89,442
Marl, greensand....do			(3)	(3)
Potassium salts....do			(3 4)	(3 4)
Sand and gravel....do	81,052	48,506	83,325	61,186
Stone....do	118,940	219,054	99,150	157,637
Miscellaneous [5]				1,825
Total value, eliminating duplications		539,261		375,945

[1] Figures obtained through cooperation with Bureau of the Census.
[2] Value not included in total value for State.
[3] Value included under "Miscellaneous."
[4] Value not included in total value for State, as value of raw product (greensand marl) is included.
[5] Includes minerals indicated by "3" above.

Mineral production of the District of Columbia in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Clay products		[1] [2] $131,080		[1] $208,683
Ferro-alloys....long tons	(3 4)	(3 4)		
Sand and gravel....short tons	(3)	(3)	561,688	583,080
Sand-lime brick....thousands	(1 3)	(1 3)	(1 3)	(1 3)
Stone....short tons	(3)	(3)	5,890	20,526
Miscellaneous		855,715		175,000
Total value, eliminating duplications		954,795		987,289

[1] Figures obtained through cooperation with Bureau of the Census.
[2] Exclusive of pottery, value for which is included under "Miscellaneous."
[3] Value included under "Miscellaneous."
[4] Value not included in total value for State.

Mineral production of Florida in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Clay products		[1] [2] $317,339		[1] $465,960
Clay, raw, short tons	53,009	[3] 711,567	56,344	[3] 772,124
Fuller's earth, do	65,976	1,032,354	(4)	(4)
Lime, do	17,793	186,650	9,424	100,241
Mineral waters, gallons sold	(5)	(5)	(5)	(5)
Monazite, pounds	2,000	[6] 120		
Peat, short tons	(4)	(4)	(4)	(4)
Phosphate rock, long tons	2,929,964	8,789,070	2,708,207	8,683,508
Sand and gravel, short tons	1,515,529	1,089,215	1,841,009	1,483,757
Sand-lime brick, thousands	[1] 26,993	[1] 315,225	[1] 19,743	[1] 223,896
Stone, short tons	4,026,790	4,687,107	6,785,430	7,411,506
Titanium minerals:				
Ilmenite, do	5,566	[6] 89,000	4,813	[6] 77,000
Rutile, do	46	[6] 11,000	30	[6] 7,500
Zircon, do	624	[6] 87,360	1,292	[6] 180,880
Miscellaneous [7]		46,219		1,117,954
Total value, eliminating duplications		16,650,659		19,752,202

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[1] Figures obtained through cooperation with Bureau of the Census.
[2] Exclusive of pottery, value for which is included under "Miscellaneous."
[3] Value not included in total value for State.
[4] Value included under "Miscellaneous."
[5] No canvass.
[6] Value estimated by the Bureau of Mines.
[7] Includes minerals indicated by "2" and "4" above.

Mineral production of Georgia in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Asbestos, short tons	(1)	(1)	(1)	(1)
Barite, do	65,936	$475,618	77,654	$532,706
Bauxite, long tons	18,220	(1)	19,680	108,650
Cement, barrels	(1)	(1)	(1)	(1)
Clay products		[2] 6,369,227		[2] [3] 5,957,486
Clay, raw, short tons	330,063	[4] 1,255,166	205,801	[4] 1,398,061
Coal, do	66,174	220,000	59,869	173,000
Coke, do	4,925	[4] 38,464	3,059	[4] 23,034
Fuller's earth, do	(1)	(1)	(1)	(1)
Gold, troy ounces	468	9,683	149	3,074
Iron ore, long tons	79,488	231,683	51,642	149,198
Lime, short tons	(1)	(1)	18,526	141,257
Manganese ore, long tons	1,649	20,281	3,251	29,890
Manganiferous ore, do	35,387	156,612	24,961	148,199
Mica:				
Scrap, short tons	(1)	(1)	(1)	(1)
Sheet, pounds	(1)	(1)	(1)	(1)
Mineral waters, gallons sold	(5)	(5)	(5)	(5)
Ore (dry and siliceous) (gold and silver), short tons	8,100	(6)	4,140	(6)
Sand and gravel, do	741,020	303,441	839,459	343,322
Silver, troy ounces	46	32	9	5
Slate		(1)		(1)
Stone, short tons	734,140	4,971,493	820,570	5,470,561
Talc, do	5,022	76,028	4,220	89,000
Miscellaneous [7]		3,669,643		4,333,619
Total value, eliminating duplications		16,503,741		17,479,967

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[1] Value included under "Miscellaneous."
[2] Figures obtained through cooperation with Bureau of the Census.
[3] Exclusive of pottery, value for which is included under "Miscellaneous."
[4] Value not included in total value for State.
[5] No canvass.
[6] Not valued as ore; value of recoverable metal content included under the metals.
[7] Includes minerals indicated by "1" and "3" above.

Mineral production of Idaho in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Antimony ore, short tons			99	(1)
Asbestos, do	(1)	(1)		
Clay products		[2] $184,007		(1 2)
Clay, raw, short tons	214	[3] 2,085	569	[3] $5,787
Coal, do	(1)	(1)	(1)	(1)
Copper, pounds	3,297,443	468,237	1,337,442	187,242
Gems and precious stones		(4)		(4)
Gold, troy ounces	20,887	431,771	13,669	282,569
Lead, short tons	126,521	22,014,636	136,490	21,838,417
Lime, do	(1)	(1)	(1)	(1)
Manganese ore, long tons			830	(1)
Manganiferous ore, do			351	(1)
Mercury, flasks	(1)	(1)	6	551
Ores (crude), etc:				
Copper, short tons	51,004	(5)	28,258	(5)
Copper-lead, do	6,275	(5)	22,037	(5)
Dry and siliceous (gold and silver), do	18,135	(5)	5,862	(5)
Lead, do	1,088,564	(5)	1,084,345	(5)
Lead-zinc, do	663,036	(5)	793,641	(5)
Zinc, do	701	(5)		
Phosphate rock, long tons	65,934	289,498	33,113	133,020
Salt, short tons	(1)	(1)	(1)	(1)
Sand and gravel, do	53,180	20,142	225,345	58,985
Silver, troy ounces	7,743,439	5,373,947	7,556,444	4,715,221
Stone, short tons	[6] 317,470	[6] 424,008	[6] 179,320	[6] 295,209
Zinc, do	15,619	2,374,030	26,307	3,946,102
Miscellaneous [7]		30,890		295,505
Total value, eliminating duplications		31,611,166		31,752,821

[1] Value included under "Miscellaneous."
[2] Figures obtained through cooperation with Bureau of the Census.
[3] Value not included in total value for State.
[4] No canvass.
[5] Not valued as ore; value of recoverable metal content included under the metals.
[6] Exclusive of unclassified stone in 1925 and of limestone in 1926, value for which is included under "Miscellaneous."
[7] Includes minerals indicated by "1" and "6" above.

Mineral production of Illinois in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Barite, short tons			(1)	(1)
Cement, barrels	[2] 6,749,532	[2] $11,481,576	[2] 6,977,598	[2] $11,388,800
Clay products		[3] 36,763,980		[3] 37,030,004
Clay, raw, short tons	218,264	[4] 384,199	205,926	[4] 410,476
Coal, do	66,909,359	146,492,000	69,366,923	148,604,000
Coke, do	3,011,497	[4] 22,568,845	3,336,962	[4] 25,050,474
Ferro-alloys, long tons			(1 4)	(1 4)
Fluorspar, short tons	54,428	1,024,516	53,734	1,012,879
Fuller's earth, do	(1)	(1)	(1)	(1)
Iron, pig, long tons	3,600,484	[4] 74,937,781	3,626,330	[4] 73,460,392
Lead, short tons	1,001	174,174	655	104,800
Lime, do	96,066	928,632	103,180	1,013,740
Marl, calcareous, do	(1)	(1)	(1)	(1)
Mineral paints, zinc and lead pigments, do	16,696	[4] 2,426,352	16,046	[4] 2,206,036
Mineral waters, gallons sold	(5)	(5)	(5)	(5)
Natural gas, M cubic feet	4,165,000	865,000	3,808,000	863,000
Natural-gas gasoline, gallons	9,874,000	1,102,000	9,987,000	967,000
Ores (crude), etc.:				
Lead-zinc, short tons	186,700	(6)	195,100	(6)
Zinc, do	45,300	(6)	50,000	(6)
Peat, do	(1)	(1)	(1)	(1)
Petroleum, barrels	7,863,000	15,235,000	7,760,000	17,200,000
Sand and gravel, short tons	14,954,536	8,140,090	17,777,169	8,714,350
Sand and sandstone (finely ground), do	87,860	529,934	84,748	529,350
Silver, troy ounces	3,000	2,082	2,990	1,866
Stone, short tons	8,576,830	7,722,683	[7] 9,145,180	[7] 8,479,277
Sulphuric acid (60° Baumé) [8], do	248,965	[4] 2,149,000	247,203	[4] 2,346,000
Tripoli, do	11,809	143,859	11,948	192,483
Zinc, do	2,724	414,048	2,577	386,550
Miscellaneous [9]		639,030		859,728
Total value, eliminating duplications		231,658,604		237,241,600

[1] Value included under "Miscellaneous."
[2] Exclusive of natural cement, value for which is included under "Miscellaneous."
[3] Figures obtained through cooperation with Bureau of the Census.
[4] Value not included in total value for State.
[5] No canvass.
[6] Not valued as ore; value of recoverable metal content included under the metals.
[7] Exclusive of sandstone, value for which is included under "Miscellaneous."
[8] From zinc smelting.
[9] Includes minerals indicated by "1", "2", and "7" above.

Mineral production of Indiana in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Cement……barrels	(1)	(1)	(1)	(1)
Clay products……		[2] $18,037,932		[2] $18,747,835
Clay, raw……short tons	188,491	[3] 204,962	206,233	[3] 237,497
Coal……do	21,224,966	42,884,000	23,186,006	45,889,000
Coke……do	5,141,940	[3] 36,635,104	5,990,344	[3] 44,143,059
Iron, pig……long tons	3,350,747	[3] 64,807,575	3,670,478	[3] 69,292,329
Lime……short tons	127,878	1,067,040	126,005	970,624
Mineral paints, zinc and lead pigments……do	(1 3)	(1 3)	(1 3)	(1 3)
Mineral waters……gallons sold	(4)	(4)	(4)	(4)
Natural gas……M cubic feet	1,168,000	504,000	901,000	379,000
Peat……short tons	4,000	28,000	(1)	(1)
Petroleum……barrels	829,000	1,615,000	808,000	1,770,000
Rubbing stones, scythestones, and whetstones……short tons	275	38,872	280	40,867
Sand and gravel……do	12,054,740	5,275,743	12,009,308	5,194,448
Sand-lime brick……thousands	(1 2)	(1 2)	(1 2)	(1 2)
Stone……short tons	[5] 4,455,310	[5] 18,140,974	4,699,230	22,797,189
Sulphuric acid [6]……do	(1 3)	(1 3)	(1 3)	(1 3)
Miscellaneous [7]……		26,199,207		24,867,257
Total value, eliminating duplications……		111,833,732		118,692,304

[1] Value included under "Miscellaneous."
[2] Figures obtained through cooperation with Bureau of the Census.
[3] Value not included in total value for State.
[4] No canvass.
[5] Exclusive of sandstone, value for which is included under "Miscellaneous."
[6] From zinc smelting.
[7] Includes minerals indicated by "1" and "5" above.

Mineral production of Iowa in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Cement……barrels	4,856,849	$8,674,563	4,788,639	$8,167,341
Clay products……		[1 2] 5,703,537		[1 2] 4,459,724
Clay, raw……short tons	2,813	[3] 3,539	1,717	[3] 13,707
Coal……do	4,714,843	14,807,000	4,625,487	14,214,000
Ferro-alloys……long tons	(3 4)	(3 4)	(3 4)	(3 4)
Gypsum……short tons	800,167	6,734,271	802,910	6,588,203
Lime……do	(4)	(4)	(4)	(4)
Mineral waters……gallons sold	(5)	(5)	(5)	(5)
Natural gas……M cubic feet	(4)	(4)		
Sand and gravel……short tons	3,297,785	1,546,900	2,694,751	1,569,006
Sand-lime brick……thousands	(1 4)	(1 4)		
Stone……short tons	805,140	870,230	938,520	897,262
Miscellaneous [6]……		1,090,659		1,000,596
Total value, eliminating duplications……		38,420,203		35,971,787

[1] Figures obtained through cooperation with Bureau of the Census.
[2] Exclusive of pottery, value for which is included under "Miscellaneous."
[3] Value not included in total value for State.
[4] Value included under "Miscellaneous."
[5] No canvass.
[6] Includes minerals indicated by "2" and "4" above.

Mineral production of Kansas in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Cement ... barrels	[1] 6, 513, 297	[1] $10, 861, 506	[1] 6, 150, 694	[1] $9, 757, 699
Chats ... short tons	208, 060	28, 969	238, 000	47, 600
Clay products		[2 3] 4, 345, 971		[2] 3, 969, 040
Coal ... short tons	4, 524, 251	13, 013, 000	4, 416, 480	12, 535, 000
Gypsum ... do	166, 952	1, 009, 510	195, 440	1, 220, 720
Lead ... do	22, 775	3, 962, 850	28, 463	4, 554, 080
Mineral paints, zinc and lead pigments ... do	(4 5)	(4 5)	(4 5)	(4 5)
Mineral waters ... gallons sold	(6)	(6)	(6)	(6)
Natural gas ... M cubic feet	26, 917, 000	9, 991, 000	38, 095, 000	12, 547, 700
Natural-gas gasoline ... gallons	19, 592, 000	2, 223, 000	25, 369, 000	2, 105, 000
Ores (crude), etc.:				
Lead ... short tons	5, 200	(7)	5, 000	(7)
Lead-zinc ... do	3, 651, 100	(7)	4, 224, 900	(7)
Zinc ... do	508, 700	(7)	487, 600	(7)
Petroleum ... barrels	38, 357, 000	74, 410, 000	41, 498, 000	93, 800, 000
Pumice ... short tons	35, 385	122, 349	48, 869	152, 190
Salt ... do	812, 540	2, 494, 423	729, 880	2, 741, 534
Sand and gravel ... do	2, 198, 870	1, 303, 060	2, 489, 343	1, 491, 492
Stone ... do	[8] 705, 780	[8] 958, 779	[8] 850, 560	[8] 1, 057, 276
Zinc ... do	118, 778	18, 054, 256	126, 307	18, 946, 050
Miscellaneous [9]		1, 927, 967		1, 701, 479
Total value, eliminating duplications		142, 944, 214		165, 060, 612

[1] Exclusive of natural cement, value for which is included under "Miscellaneous."
[2] Figures obtained through cooperation with Bureau of the Census.
[3] Exclusive of pottery, value for which is included under "Miscellaneous."
[4] Value included under "Miscellaneous."
[5] Value not included in total value for State.
[6] No canvass.
[7] Not valued as ore; value of recoverable metal content included under the metals.
[8] Exclusive of sandstone, value for which is included under "Miscellaneous."
[9] Includes minerals indicated by "1", "3", "4", and "8" above.

Mineral production of Kentucky in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Asphalt (native) ... short tons	286, 850	$2, 493, 360	320, 430	$2, 530, 480
Barite ... do			(1)	(1)
Cement ... barrels	(1)	(1)	(1)	(1)
Clay products		[2] 7, 853, 355		[2] 7, 676, 858
Clay, raw ... short tons	121, 917	[3] 548, 015	128, 585	[3] 706, 776
Coal ... do	55, 068, 670	94, 825, 000	62, 924, 462	109, 740, 000
Coke ... do	(1 3)	(1 3)	(1 3)	(1 3)
Fluorspar ... do	44, 826	833, 794	62, 494	1, 167, 129
Iron, pig ... long tons	153, 935	(1 3)	148, 053	(1 3)
Lead ... short tons	152	26, 448	58	9, 280
Lime ... do	9, 433	71, 300	8, 550	55, 663
Mineral waters ... gallons sold	(4)	(4)	(4)	(4)
Natural gas ... M cubic feet	10, 770, 000	3, 213, 000	10, 410, 000	3, 378, 000
Natural-gas gasoline ... gallons	7, 685, 000	884, 000	7, 689, 000	914, 000
Ores (lead and zinc) ... short tons	(5)	(5)	(5)	(5)
Petroleum ... barrels	6, 759, 000	15, 682, 000	6, 274, 000	15, 250, 000
Phosphate rock ... long tons	(1)	(1)	(1)	(1)
Sand and gravel ... short tons	2, 402, 982	1, 770, 458	3, 214, 487	2, 234, 586
Stone ... do	1, 703, 010	2, 127, 504	1, 907, 960	2, 168, 183
Whetstones ... do	(1)	(1)	(1)	(1)
Zinc ... do	429	65, 208	1, 838	275, 700
Miscellaneous [6]		7, 718, 442		8, 183, 913
Total value, eliminating duplications		131, 370, 840		146, 768, 273

[1] Value included under "Miscellaneous."
[2] Figures obtained through cooperation with Bureau of the Census.
[3] Value not included in total value for State.
[4] No canvass.
[5] Figures not available.
[6] Includes minerals indicated by "1" above.

Mineral production of Louisiana in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Clay products		[1] [2] $674,167		[1] $682,307
Lime, short tons			(3)	(3)
Mineral waters, gallons sold	(4)	(4)	(4)	(4)
Natural gas, M cubic feet	152,620,000	8,125,000	157,423,000	8,768,000
Natural-gas gasoline, gallons	43,489,000	4,216,000	43,557,000	3,692,000
Petroleum, barrels	20,272,000	32,500,000	23,201,000	38,200,000
Salt, short tons	500,350	2,218,265	520,400	2,457,875
Sand and gravel, do	2,807,761	1,766,452	2,689,840	1,784,315
Sand-lime brick, thousands	(1 3)	(1 3)	(1 3)	(1 3)
Stone, short tons	(3)	(3)	122,870	207,883
Sulphur, long tons	(3)	(3)	(3)	(3)
Miscellaneous [5]		11,004,007		6,411,163
Total value, eliminating duplications		60,503,891		62,203,543

[1] Figures obtained through cooperation with Bureau of the Census.
[2] Exclusive of pottery, value for which is included under "Miscellaneous."
[3] Value included under "Miscellaneous."
[4] No canvass.
[5] Includes minerals indicated by "[2]" and "[3]" above.

Mineral production of Maine in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Clay products		[1] $625,969		(1 2)
Clay, raw, short tons	(2 3)	(2 3)	(2 3)	(2 3)
Feldspar (crude), long tons	28,404	256,731	33,897	$306,695
Gems and precious stones		(4)		(4)
Lime, short tons	115,571	1,291,812	128,120	1,615,776
Marl, calcareous, do			(2)	(2)
Mica:				
Scrap, do	(2)	(2)		
Sheet, pounds	(2)	(2)		
Mineral waters, gallons sold	(4)	(4)	(4)	(4)
Peat, short tons	(2)	(2)		
Sand and gravel, do	407,760	155,014	491,260	220,931
Silica (quartz), do	(2)	(2)	328	1,050
Slate		604,062		662,184
Stone, short tons	[5] 361,570	[5] 2,870,442	311,830	2,360,593
Miscellaneous [6]		38,942		622,294
Total value, eliminating duplications		5,838,718		5,785,619

[1] Figures obtained through cooperation with Bureau of the Census.
[2] Value included under "Miscellaneous."
[3] Value not included in total value for State.
[4] No canvass.
[5] Exclusive of unclassified stone, value for which is included under "Miscellaneous."
[6] Includes minerals indicated by "[2]" and "[5]" above.

Mineral production of Maryland in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Asbestos____short tons__	(1)	(1)	(1)	(1)
Briquets, fuel____do____	(1 2)	(1 2)	(1 2)	(1 2)
Cement____barrels__	(1)	(1)	(1)	(1)
Chromite____long tons__	25	$455	50	$1,100
Clay products____	____	[3, 4] 2,868,452	____	[3] 6,073,247
Clay, raw____short tons__	91,032	[2] 168,606	61,326	[2] 130,918
Coal____do____	2,694,572	5,312,000	3,078,353	6,800,000
Coke____do____	1,019,209	(1 2)	1,120,610	(1 2)
Diatomite____do____	____	____	220	2,400
Feldspar (crude)____long tons___	4,554	26,438	(1)	(1)
Ferro-alloys____do____	20,360	(1 2)	(1 2)	(1 2)
Iron, pig____do____	693,523	(1 2)	791,637	(1 2)
Lime____short tons__	64,518	524,100	63,639	524,242
Marl, calcareous____do____	(1)	(1)	(1)	(1)
Mineral waters____gallons sold__	(5)	(5)	(5)	(5)
Potassium salts____short tons__	[6] 4,509	225,482	(1)	(1)
Sand and gravel____do____	3,619,534	3,500,130	3,467,211	3,115,454
Silica (quartz)____do____	5,011	52,849	4,681	47,507
Slate____	____	210,148	____	207,989
Stone____short tons__	[7] 1,136,880	[7] 1,853,881	[7] 1,432,290	[7] 2,177,102
Talc____do____	2,718	35,488	2,857	41,780
Miscellaneous [8]____	____	27,782,743	____	27,374,915
Total value, eliminating duplications____	____	21,557,810	____	24,066,996

[1] Value included under "Miscellaneous."
[2] Value not included in total value for State.
[3] Figures obtained through cooperation with Bureau of the Census.
[4] Exclusive of pottery, value for which is included under "Miscellaneous."
[5] No canvass.
[6] K_2O content.
[7] Exclusive of marble, value for which is included under "Miscellaneous."
[8] Includes minerals indicated by "1", "4", and "7" above.

Mineral production of Massachusetts in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Clay products____	____	[1] $3,789,164	____	[1] $3,971,586
Clay, raw____short tons__	2,270	[2] 31,538	1,950	[2] 28,973
Coke____do____	535,302	(2 3)	573,748	(2 3)
Fuller's earth____do____	(3)	(3)	(3)	(3)
Iron, pig____long tons__	____	____	23,130	(2 3)
Lime____short tons__	197,732	2,610,279	202,065	2,653,746
Manganese ore____long tons__	(3)	(3)	____	____
Manganiferous ore____do____	(3)	(3)	(3)	(3)
Mineral waters____gallons sold_	(4)	(4)	(4)	(4)
Sand and gravel____short tons__	3,349,091	3,116,323	2,969,172	3,276,787
Sand-lime brick____thousands__	(1 3)	(1 3)	(1 3)	(1 3)
Silica (quartz)____short tons__	(3)	(3)	(3)	(3)
Stone____do____	[5] 2,209,560	[5] 6,640,333	[5] 2,089,340	[5] 6,216,793
Miscellaneous [6]____	____	5,443,850	____	6,284,324
Total value, eliminating duplications____	____	16,831,529	____	16,786,577

[1] Figures obtained through cooperation with Bureau of the Census.
[2] Value not included in total value for State.
[3] Value included under "Miscellaneous."
[4] No canvass.
[5] Exclusive of sandstone, value for which is included under "Miscellaneous."
[6] Includes minerals indicated by "3" and "5" above.

Mineral production of Michigan in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Bromine, pounds	(1)	(1)	(1)	(1)
Calcium chloride, short tons	59, 510	$1, 316, 603	(1)	(1)
Cement, barrels	10, 073, 453	17, 511, 908	11, 959, 447	$19, 499, 788
Clay products		[2] 7, 396, 071		[2] 7, 362, 007
Clay, raw, short tons	3, 953	[3] 7, 405	4, 287	[3] 9, 349
Coal, do	808, 233	3, 391, 000	686, 707	2, 829, 000
Coke, do	1, 751, 118	[3] 11, 708, 519	1, 826, 638	[3] 12, 713, 083
Copper, pounds	155, 157, 488	22, 032, 363	175, 381, 565	24, 553, 419
Gems and precious stones		(4)		(4)
Graphite, amorphous, short tons	(1)	(1)	(1)	(1)
Grindstones, do	(1)	(1)	(1)	(1)
Gypsum, do	649, 053	5, 447, 294	659, 685	5, 021, 465
Iron ore:				
Sold to furnaces, long tons	15, 254, 003	40, 926, 315	16, 699, 984	43, 932, 982
Sold for paint, do	4, 604	(1)	2, 942	(1)
Iron, pig, do	831, 435	[3] 18, 452, 346	638, 282	[3] 13, 180, 113
Lime, short tons	95, 036	909, 952	107, 671	995, 123
Magnesium, pounds	(1 3)	(1 3)	181, 300	[3] 219, 370
Magnesium chloride (natural), do	(1)	(1)	(1)	(1)
Magnesium sulphate (natural), do	(1)	(1)	(1)	(1)
Manganiferous ore, long tons	98, 753	(1)	107, 202	(1)
Marl, calcareous, short tons	(1)	(1)		
Mineral waters, gallons sold	(4)	(4)	(4)	(4)
Natural gas, M cubic feet	400	200	400	200
Ore (copper), short tons	7, 036, 751	(5)	7, 641, 682	(5)
Peat, do	800	20, 000	(1)	(1)
Petroleum, barrels	4, 000	10, 000	94, 000	253. 000
Salt, short tons	2, 172, 600	7, 710, 331	2, 260, 320	7, 594, 418
Sand and gravel, do	10, 878, 375	5, 684, 474	14, 398, 338	7, 265, 161
Sand-lime brick, thousands	[2] 97, 828	[2] 1, 175, 776	[2] 108, 434	[2] 1, 341, 284
Silver, troy ounces	139, 499	96, 812	105, 242	65, 671
Stone, short tons	11, 598, 680	6, 671, 804	[6] 10, 885, 730	[6] 6, 715, 429
Miscellaneous [7]		2, 031, 191		3, 431, 662
Total value, eliminating duplications		122, 212, 254		130, 860, 609

[1] Value included under "Miscellaneous."
[2] Figures obtained through cooperation with Bureau of the Census.
[3] Value not included in total value for State.
[4] No canvass.
[5] Not valued as ore; value of recoverable metal content included under the metals.
[6] Exclusive of sandstone, value for which is included under "Miscellaneous."
[7] Includes minerals indicated by "1" and "6" above.

Mineral production of Minnesota in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Cement, barrels	(1)	(1)	(1)	(1)
Clay products		[2 3] $1, 764, 860		[2 3] $1, 852, 566
Clay, raw, short tons	(1 4)	(1 4)	11, 850	[4] 26, 719
Coke, do	518, 355	[4] 4, 992, 024	619, 905	[4] 6, 014, 738
Flint lining for tube mills, do	(1)	(1)	(1)	(1)
Gems and precious stones		(5)		(5)
Iron ore:				
Sold to furnaces, long tons	38, 022, 237	96, 083, 485	40, 961, 361	103, 715, 621
Sold for paint, do	84	(1)		
Iron, pig, do	276, 240	(1 4)	292, 658	(1 4)
Lime, short tons	(1)	(1)	28, 522	296, 068
Manganiferous ore, long tons	819, 074	1, 761, 422	958, 217	(1)
Mineral waters, gallons sold	(5)	(5)	(5)	(5)
Pebbles for grinding, short tons	(1)	(1)	(1)	(1)
Sand and gravel, do	3, 015, 793	2, 046, 250	3, 271, 884	1, 913, 708
Sand-lime brick, thousands	(1 2)	(1 2)	[2] 12, 389	[2] 124, 265
Stone, short tons	753, 740	3, 784, 252	682, 800	3, 746, 392
Miscellaneous [6]		10, 511, 439		12, 744, 187
Total value, eliminating duplications		110, 252, 956		118, 361, 306

[1] Value included under "Miscellaneous."
[2] Figures obtained through cooperation with Bureau of the Census.
[3] Exclusive of pottery, value for which is included under "Miscellaneous."
[4] Value not included in total value for State.
[5] No canvass.
[6] Includes minerals indicated by "1" and "3" above.

Mineral production of Mississippi in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Clay products		[1] $1,050,241		[1,2] $1,006,661
Clay, raw short tons	2,229	[3] 11,090	4,873	[3] 34,958
Mineral waters gallons sold	(4)	(4)	(4)	(4)
Sand and gravel short tons	2,531,515	1,120,709	1,952,783	871,638
Stone do	(5)	(5)	(5)	(5)
Miscellaneous [6]		995		4,687
Total value, eliminating duplications		2,171,945		1,882,986

[1] Figures obtained through cooperation with Bureau of the Census.
[2] Exclusive of pottery, value for which is included under "Miscellaneous."
[3] Value not included in total value for State.
[4] No canvass.
[5] Value included under "Miscellaneous."
[6] Includes minerals indicated by "2" and "5" above.

Mineral production of Missouri in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Barite short tons	101,056	$794,927	118,919	$946,595
Briquets, fuel do	(1 2)	(1 2)	(1 2)	(1 2)
Cement barrels	8,168,165	14,155,795	7,639,966	12,917,342
Chats short tons	1,596,409	399,102	1,679,800	419,940
Clay products		[3,4] 17,521,866		[3] 17,618,931
Clay, raw short tons	453,006	[2] 1,463,880	460,746	[2] 1,571,026
Coal do	2,694,215	8,281,000	3,008,495	8,951,000
Coke do	(1 2)	(1 2)	(1 2)	(1 2)
Copper pounds	12,100	1,718	1,077,000	150,780
Iron ore long tons	40,043	(1)	124,371	532,536
Iron, pig do	3,758	(1 2)		
Lead short tons	211,566	36,812,484	207,012	33,121,920
Lime do	273,348	2,610,954	263,467	2,218,943
Mineral paints, zinc and lead pigments do	(1 2)	(1 2)	(1 2)	(1 2)
Mineral waters gallons sold	(5)	(5)	(5)	(5)
Natural gas M cubic feet	34,000	29,700	1,000	700
Ores (crude), etc.:				
Copper short tons	22	(6)	27	(6)
Lead do	6,281,800	(6)	6,324,500	(6)
Lead-zinc do	171,700	(6)	412,000	(6)
Zinc do	418,500	(6)	550,600	(6)
Sand and gravel do	5,523,605	3,595,187	4,611,952	2,980,242
Sand and sandstone (finely ground) do	(1)	(1)	(1)	(1)
Silver troy ounces	83,340	57,838	90,000	56,160
Stone short tons	[7] 2,796,510	[7] 5,662,835	3,093,000	6,012,013
Tripoli do	(1)	(1)	(1)	(1)
Zinc do	14,794	2,248,688	26,018	3,902,700
Miscellaneous [8]		4,654,101		4,129,106
Total value, eliminating duplications		92,548,473		90,003,537

[1] Value included under "Miscellaneous."
[2] Value not included in total value for State.
[3] Figures obtained through cooperation with Bureau of the Census.
[4] Exclusive of pottery, value for which is included under "Miscellaneous."
[5] No canvass.
[6] Not valued as ore; value of recoverable metal content included under the metals.
[7] Exclusive of unclassified stone, value for which is included under "Miscellaneous."
[8] Includes minerals indicated by "1", "4", and "7" above.

Mineral production of Montana in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Arsenious oxide ... short tons	6,019	$361,140	6,190	$301,396
Cement ... barrels	(1)	(1)	(1)	(1)
Clay products		[2] 271,187		[2] 273,121
Clay, raw ... short tons	13,526	[3] 28,299	14,986	[3] 17,245
Coal ... do	3,043,686	7,879,000	2,797,760	6,883,000
Copper ... pounds	268,910,847	38,185,340	255,372,862	35,752,201
Ferro-alloys ... long tons	(1 3)	(1 3)	(1 3)	(1 3)
Gems and precious stones		(4)		(4)
Gold ... troy ounces	82,123	1,697,630	60,504	1,250,731
Graphite, crystalline ... pounds	(1)	(1)		
Gypsum ... short tons	(1)	(1)	(1)	(1)
Iron ore ... long tons	3,672	10,244	724	1,810
Lead ... short tons	18,765	3,265,166	21,153	3,384,495
Lime ... do	6,269	44,992	8,099	64,916
Manganese ore ... long tons	76,188	1,411,001	23,617	(1)
Mineral waters ... gallons sold	(4)	(4)	(4)	(4)
Natural gas ... M cubic feet	1,496,000	350,000	2,283,000	450,000
Ores (crude), etc.:				
Copper ... short tons	3,190,841	(5)	3,179,051	(5)
Copper-lead ... do	195,327	(5)	224,322	(5)
Dry and siliceous (gold and silver) ... do	194,691	(5)	93,571	(5)
Lead ... do	118,062	(5)	132,039	(5)
Lead-zinc ... do	686,816	(5)	820,081	(5)
Zinc ... do	19,271	(5)	20,991	(5)
Petroleum ... barrels	4,091,000	6,420,000	7,727,000	10,170,000
Sand and gravel ... short tons	1,024,983	293,397	935,443	313,268
Silver ... troy ounces	13,158,191	9,131,784	12,769,092	7,967,913
Stone ... short tons	[6] 237,860	[6] 222,566	[6] 294,120	[6] 257,919
Sulphuric acid (60° Baumé) [7] ... do	52,304	(1 3)	37,559	(1 3)
Zinc ... do	57,658	8,764,086	73,701	11,055,113
Miscellaneous [8]		1,473,233		1,843,598
Total value, eliminating duplications		79,261,284		79,762,630

[1] Value included under "Miscellaneous."
[2] Figures obtained through cooperation with Bureau of the Census.
[3] Value not included in total value for State.
[4] No canvass.
[5] Not valued as ore; value of recoverable metal content included under the metals.
[6] Exclusive of basalt and unclassified stone in 1925 and of basalt in 1926, value for which is included under "Miscellaneous."
[7] From copper smelting.
[8] Includes minerals indicated by "1" and "6" above.

Mineral production of Nebraska in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Cement ... barrels	(1)	(1)	(1)	(1)
Clay products		[2 3] $964,258		[2 3] $1,112,923
Clay, raw ... short tons	29,169	[4] 30,589	35,363	[4] 37,260
Mineral waters ... gallons sold	(5)	(5)	(5)	(5)
Pumice ... short tons	4,657	46,564	(1)	(1)
Sand and gravel ... do	2,651,473	1,027,096	2,134,452	1,124,764
Stone ... do	135,910	225,669	105,740	185,057
Miscellaneous [6]		1,094,998		899,716
Total value, eliminating duplications		3,358,585		3,322,460

[1] Value included under "Miscellaneous."
[2] Figures obtained through cooperation with Bureau of the Census.
[3] Exclusive of pottery, value for which is included under "Miscellaneous."
[4] Value not included in total value for State.
[5] No canvass.
[6] Includes minerals indicated by "1" and "3" above.

Mineral production of Nevada in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Antimony ore……short tons	(1)	(1)		
Barite……do	(1)	(1)	(1)	(1)
Borates……do	(1)	(1)	(1)	(1)
Clay products		(1 2)		(1 2)
Clay, raw……short tons	1,719	[3] $17,695	12,018	[3] $78,827
Copper……pounds	79,300,224	11,260,632	101,827,937	14,255,911
Diatomite……short tons	510	13,800	230	4,350
Fuller's earth……do	(1)	(1)	(1)	(1)
Gems and precious stones		(4)		(4)
Gold……troy ounces	187,105	3,867,798	175,382	3,625,461
Graphite, amorphous……short tons	(1)	(1)	(1)	(1)
Gypsum……do	350,130	1,721,809	350,972	1,527,235
Lead……do	12,238	2,129,451	11,184	1,789,437
Lime……do	(1)	(1)	23,162	239,469
Manganese ore……long tons	850	(1)	1,607	(1)
Manganiferous ore:				
For fluxing……do	16,168	(1)	11,051	(1)
For other purposes……do	6,659	(1)	12,205	58,941
Mercury……flasks	539	44,806	197	18,105
Mica, sheet……pounds	(1)	(1)		
Mineral waters……gallons sold	(4)	(4)	(4)	(4)
Ores (crude), etc.:				
Copper……short tons	3,923,158	(5)	4,888,681	(5)
Copper-lead……do	125	(5)	10,151	(5)
Dry and siliceous (gold and silver)……do	844,948	(5)	806,518	(5)
Lead……do	94,769	(5)	111,265	(5)
Lead-zinc……do	61,865	(5)	67,641	(5)
Zinc……do	2,274	(5)	312	(5)
Salt……do	(1)	(1)	(1)	(1)
Sand and gravel……do	509,998	174,527	515,267	205,583
Silica (quartz)……do	2,419	12,264	2,292	12,125
Silver……troy ounces	7,096,618	4,925,053	6,518,983	4,067,845
Sodium sulphate from natural sources……short tons	(1)	(1)	180	1,750
Stone……do	102,710	127,359	[6] 59,030	[6] 89,072
Sulphur……long tons	(1)	(1)		
Tungsten ore (60 per cent concentrates)……short tons	407	257,600	545	356,700
Zinc……do	7,411	1,126,418	5,409	811,337
Miscellaneous [7]		808,384		549,911
Total value, eliminating duplications		26,469,901		27,613,232

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[1] Value included under "Miscellaneous."
[2] Figures obtained through cooperation with Bureau of the Census.
[3] Value not included in total value for State.
[4] No canvass.
[5] Not valued as ore; value of recoverable metal content included under the metals.
[6] Exclusive of marble, value for which is included under "Miscellaneous."
[7] Includes minerals indicated by "[1]" and "[6]" above.

Mineral production of New Hampshire in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Clay products		[1] $828,541		[1] $881,997
Diatomite……short tons	2	100	2	130
Feldspar (crude)……long tons	38,366	278,736	33,271	287,596
Garnet, abrasive……short tons	(2)	(2)	(2)	(2)
Mica:				
Scrap……do	1,953	47,525	1,738	38,213
Sheet……pounds	1,120,857	198,858	1,371,890	235,890
Millstones		2,908		3,563
Mineral waters……gallons sold	(3)	(3)	(3)	(3)
Sand and gravel……short tons	424,330	316,248	708,098	731,639
Scythestones……do	(2)	(2)	(2)	(2)
Silica (quartz)……do	(2)	(2)	277	1,053
Stone……do	[4] 130,120	[4] 1,712,138	148,250	1,908,284
Miscellaneous [5]		79,783		56,280
Total value, eliminating duplications		3,464,837		4,144,645

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[1] Figures obtained through cooperation with Bureau of the Census.
[2] Value included under "Miscellaneous."
[3] No canvass.
[4] Exclusive of unclassified stone, value for which is included under "Miscellaneous."
[5] Includes minerals indicated by "[2]" and "[4]" above.

Mineral production of New Jersey in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Briquets, fuel ... short tons	(1 2)	(1 2)	(1 2)	(1 2)
Cement ... barrels	(1)	(1)	(1)	(1)
Clay products		[3] $46,010,624		[3] $47,512,514
Clay, raw ... short tons	343,203	[2] 1,418,979	342,586	[2] 1,463,288
Coke ... do	903,997	(1 2)	913,250	(1 2)
Ferro-alloys ... long tons	(1 2)	(1 2)	(1 2)	(1 2)
Iron ore:				
Sold to furnaces ... do	164,523	678,021	212,152	925,403
Sold for paint ... do	952	(1)		
Iron, pig ... do	(1 2)	(1 2)	(1 2)	(1 2)
Lime ... short tons	(1)	(1)	(1)	(1)
Manganiferous residuum [4] ... long tons	147,937	(1)	179,926	(1)
Marl, greensand ... short tons	12,728	179,788	12,606	174,365
Mineral waters ... gallons sold	(5)	(5)	(5)	(5)
Ore (zinc) ... short tons	606,177	(6)	573,300	(6)
Peat ... do	31,530	160,695	29,326	129,664
Sand and gravel ... do	4,935,934	3,680,064	4,455,412	3,576,320
Sand and sandstone (finely ground) ... do			(1)	(1)
Sand-lime brick ... thousands	(1 3)	(1 3)	[3] 49,854	[3] 585,703
Stone ... short tons	2,335,820	3,656,943	2,315,450	3,589,119
Talc ... do	(1)	(1)	(1)	(1)
Zinc ... do	89,261	(1)	80,629	(1)
Miscellaneous [7]		30,749,885		28,839,630
Total value, eliminating duplications		76,761,313		77,065,713

[1] Value included under "Miscellaneous."
[2] Value not included in total value for State.
[3] Figures obtained through cooperation with Bureau of the Census.
[4] Ore mined in New Jersey; smelted in Pennsylvania.
[5] No canvass.
[6] Not valued as ore; value of recoverable metal content included under the metal.
[7] Includes minerals indicated by "1" above.

Mineral production of New Mexico in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Clay products		[1] $144,639		(1 2)
Clay, raw ... short tons	4,753	[3] 12,657	2,118	[3] $10,517
Coal ... do	2,556,851	8,611,000	2,817,923	8,916,000
Coke ... do	(2 3)	(2 3)	(2 3)	(2 3)
Copper ... pounds	76,427,825	10,852,751	81,642,379	11,429,933
Fluorspar ... short tons	2,639	40,325	1,989	(2)
Gems and precious stones		(4)		(4)
Gold ... troy ounces	26,561	549,073	19,631	405,803
Gypsum ... short tons	(2)	(2)	(2)	(2)
Iron ore ... long tons	172,959	(2)	216,269	(2)
Lead ... short tons	3,210	558,545	3,480	556,829
Lime ... do	1,329	14,010	2,032	20,479
Lithium minerals ... do	(2)	(2)	(2)	(2)
Manganese ore ... long tons	1,588	(2)	1,966	(2)
Manganiferous ore ... do	40,848	153,251	81,440	(2)
Mica:				
Scrap ... short tons	920	14,580	988	16,683
Sheet ... pounds	34,486	7,531	46,104	5,824
Mineral waters ... gallons sold	(4)	(4)	(4)	(4)
Molybdenum ... pounds	(2)	(2)	(2)	(2)
Natural gas ... M cubic feet	(2)	(2)	921,000	75,000
Natural-gas gasoline ... gallons			1,488,000	146,000
Ores (crude), etc.:				
Copper ... short tons	3,172,291	(5)	3,644,936	(5)
Copper-lead ... do	327	(5)	5	(5)
Dry and siliceous (gold and silver) ... do	58,862	(5)	25,876	(5)
Lead ... do	17,239	(5)	22,508	(5)
Lead-zinc ... do	12,121	(5)	17,160	(5)
Zinc ... do	97,726	(5)	115,409	(5)
Petroleum ... barrels	1,060,000	1,815,000	1,666,000	3,270,000
Salt ... short tons	(2)	(2)	(2)	(2)
Sand and gravel ... do	141,013	107,204	128,577	86,805
Silver ... troy ounces	735,124	510,176	450,934	281,383
Stone ... short tons	121,950	92,034	(2)	(2)
Zinc ... do	9,246	1,405,415	12,052	1,807,860
Miscellaneous [6]		1,397,128		1,953,725
Total value, eliminating duplications		25,696,009		28,513,991

[1] Figures obtained through cooperation with Bureau of the Census.
[2] Value included under "Miscellaneous."
[3] Value not included in total value for State.
[4] No canvass.
[5] Not valued as ore; value of recoverable metal content included under the metals.
[6] Includes minerals indicated by "2" above.

Mineral production of New York in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Aluminum ... pounds	(1 2)	(1 2)	(1 2)	(1 2)
Cement ... barrels	[3] 8,534,089	[3] $14,967,642	[3] 8,535,862	[3] $14,864,066
Clay products		[4] 24,550,751		[4] 28,999,053
Clay, raw ... short tons	7,503	[2] 47,637	13,688	[2] 98,616
Coke ... do	2,219,409	[2] 12,968,066	2,827,805	[2] 17,455,226
Diatomite ... do	114	7,528	187	12,770
Emery ... do	769	5,907	386	3,641
Feldspar (crude) ... long tons	10,474	70,446	15,517	157,865
Ferro-alloys ... do	115,764	[2] 12,811,534	104,198	[2] 13,045,938
Garnet, abrasive ... short tons	7,614	669,545	5,812	494,050
Graphite, artificial ... pounds	12,135,655	(1 2)	21,163,986	(1 2)
Gypsum ... short tons	1,730,254	16,219,906	1,723,460	16,794,589
Iron ore:				
Sold to furnaces ... long tons	413,517	1,988,735	659,741	3,015,586
Sold for paint ... do	15,731	85,691	(1)	(1)
Iron, pig ... do	2,151,036	[2] 40,435,443	2,389,665	[2] 44,970,196
Lime ... short tons	104,829	1,030,960	107,326	1,016,647
Magnesium ... pounds	(1 2)	(1 2)	141,350	[2] 171,030
Millstones		14,063		23,629
Mineral waters ... gallons sold	(5)	(5)	(5)	(5)
Natural gas ... M cubic feet	6,210,000	3,778,000	7,027,000	4,499,000
Natural-gas gasoline ... gallons	414,000	46,000	539,000	66,000
Ore (zinc) ... short tons	47,254	(6)	42,500	(6)
Peat ... do	767	7,797	(1)	(1)
Petroleum ... barrels	1,695,000	6,270,000	1,956,000	7,200,000
Pyrites ... long tons	6,168	13,878	7,635	(1)
Salt ... short tons	2,053,970	7,133,244	2,001,580	6,564,829
Sand and gravel ... do	14,966,616	9,750,433	19,334,360	11,585,652
Sand-lime brick ... thousands	[4] 13,259	[4] 190,870	[4] 11,510	[4] 158,283
Silica (quartz) ... short tons	(1)	(1)	2,135	13,121
Slate		851,715		913,814
Stone ... short tons	[7] 8,869,200	[7] 12,358,238	9,708,700	13,713,620
Talc ... do	85,109	993,913	83,231	1,030,075
Zinc ... do	5,158	784,016	5,041	756,150
Miscellaneous [8]		25,900,609		28,831,260
Total value, eliminating duplications		102,035,557		112,016,262

[1] Value included under "Miscellaneous."
[2] Value not included in total value for State.
[3] Exclusive of natural cement, value for which is included under "Miscellaneous."
[4] Figures obtained through cooperation with Bureau of the Census.
[5] No canvass.
[6] Not valued as ore; value of recoverable metal content included under the metal.
[7] Exclusive of basalt and unclassified stone, value for which is included under "Miscellaneous."
[8] Includes minerals indicated by "1", "3", and "7" above.

Mineral production of North Carolina in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Aluminum ... pounds	(1 2)	(1 2)	(1 2)	(1 2)
Barite ... short tons	(1)	(1)		
Clay products		[3] $3,868,962		[3] $4,256,901
Clay, raw ... short tons	18,983	[2] 310,683	20,769	[2] 331,562
Coal ... do	65,153	283,000	57,939	243,000
Copper ... pounds			1,468,700	205,618
Feldspar (crude) ... long tons	76,806	496,563	91,433	602,020
Gems and precious stones		(4)		(4)
Gold ... troy ounces	897	18,540	79	1,631
Iron ore:				
Sold to furnaces ... long tons	22,011	49,511	14,798	31,645
Sold for paint ... do			400	(1)
Lime ... short tons	(1)	(1)	(1)	(1)
Manganese ore ... long tons	(1)	(1)	55	(1)
Marl, calcareous ... short tons	(1)	(1)	400	1,200
Mica:				
Scrap ... do	5,095	74,818	2,880	54,048
Sheet ... pounds	592,478	105,376	700,313	150,362
Mica schist ... short tons			(1)	(1)
Millstones		(1)		3,450
Mineral waters ... gallons sold	(4)	(4)	(4)	(4)
Ores (crude):				
Copper ... short tons			15,150	(5)
Dry and siliceous (gold and silver) ... do	6,030	(5)	420	(5)
Sand and gravel ... do	1,108,035	886,351	1,630,789	968,021
Sand and sandstone (finely ground) ... do	(1)	(1)		
Silica (quartz) ... do	2,708	10,692	2,134	17,457
Silver ... troy ounces	108	75	21	13
Stone ... short tons	[6] 1,565,690	[6] 3,478,855	[6] 1,843,480	[6] 4,005,087
Sulphuric acid [7] ... do			(1 2)	(1 2)
Talc and soapstone ... do	(1)	(1)	(1)	(1)
Miscellaneous [8]		6,060,120		5,935,602
Total value, eliminating duplications		9,504,063		10,992,793

[1] Value included under "Miscellaneous."
[2] Value not included in total value for State.
[3] Figures obtained through cooperation with Bureau of the Census.
[4] No canvass.
[5] Not valued as ore; value of recoverable metal content included under the metals.
[6] Exclusive of marble in 1925 and of marble and unclassified stone in 1926, value for which is included under "Miscellaneous."
[7] From copper smelting.
[8] Includes minerals indicated by "1" and "6" above.

Mineral production of North Dakota in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Clay products		[1] $149,774		(1 2)
Clay, raw ... short tons	29	[3] 312	(2 3)	(2 3)
Coal ... do	1,324,620	2,445,000	1,370,244	$2,378,000
Mineral waters ... gallons sold	(4)	(4)	(4)	(4)
Natural gas ... M cubic feet	(2)	(2)	(2)	(2)
Sand and gravel ... short tons	248,084	67,155	653,950	240,525
Miscellaneous [5]		100		186,685
Total value, eliminating duplications		2,662,029		2,804,837

[1] Figures obtained through cooperation with Bureau of the Census.
[2] Value included under "Miscellaneous."
[3] Value not included in total value for State.
[4] No canvass.
[5] Includes minerals indicated by "2" above.

Mineral production of Ohio in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Bromine ... pounds	(1)	(1)		
Calcium chloride ... short tons	(1)	(1)	(1)	(1)
Cement ... barrels	[2] 5,426,768	[2] $9,600,084	[2] 7,422,720	[2] $12,831,503
Clay products		[3] 97,991,821		[3] 97,873,102
Clay, raw ... short tons	309,109	[4] 761,488	338,614	[4] 850,260
Coal ... do	28,034,112	54,057,000	27,872,488	54,759,000
Coke ... do	[5] 7,105,129	[4 5] 34,190,691	[5] 7,547,836	[4 5] 40,344,524
Ferro-alloys ... long tons	105,198	[4] 3,005,337	114,796	[4] 3,779,525
Grindstones and pulpstones ... short tons	29,460	1,065,301	28,969	1,150,135
Gypsum ... do	551,479	6,394,132	521,205	5,797,221
Iron ore ... long tons	2,410	(1)		
Iron, pig ... do	8,857,615	[4] 173,418,068	9,177,127	[4] 176,433,401
Lime ... short tons	1,089,385	10,970,605	1,056,589	10,348,880
Marl, calcareous ... do	(1)	(1)	(1)	(1)
Mineral paints, zinc and lead pigments ... do	(1 4)	(1 4)	(1 4)	(1 4)
Mineral waters ... gallons sold	(6)	(6)	(6)	(6)
Natural gas ... M cubic feet	43,235,000	22,377,000	47,363,000	25,403,000
Natural-gas gasoline ... gallons	8,701,000	990,000	10,817,000	1,402,000
Petroleum ... barrels	7,212,000	18,280,000	7,272,000	19,180,000
Pyrites ... long tons	100	300	200	(1)
Rubbing stones, scythestones, and whetstones ... short tons	225	35,750	846	26,596
Salt ... do	1,173,590	4,116,625	1,164,400	3,209,473
Sand and gravel ... do	11,296,160	8,353,913	11,716,926	7,840,316
Sand-lime brick ... thousands	(1 3)	(1 3)	(1 3)	(1 3)
Stone ... short tons	[7] 12,010,510	[7] 13,084,572	13,103,140	13,763,207
Sulphuric acid [8] ... do	(1 4)	(1 4)	(1 4)	(1 4)
Miscellaneous [9]		4,933,529		4,574,463
Total value, eliminating duplications		247,506,588		253,883,995

[1] Value included under "Miscellaneous."
[2] Exclusive of natural cement, value for which is included under "Miscellaneous."
[3] Figures obtained through cooperation with Bureau of the Census.
[4] Value not included in total value for State.
[5] Exclusive of 156,058 tons of beehive coke in 1925 and 84,970 tons in 1926, value for which is included under "Miscellaneous," but not in total value for State.
[6] No canvass.
[7] Exclusive of unclassified stone, value for which is included under "Miscellaneous."
[8] From zinc smelting.
[9] Includes minerals indicated by "1", "2", "5", and "7" above.

Mineral production of Oklahoma in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Asphalt (native) ... short tons	27,450	$82,830	37,010	$121,830
Calcium chloride ... do			(1)	(1)
Cement ... barrels	(1)	(1)	(1)	(1)
Chats ... short tons	269,000	49,900	410,000	81,000
Clay products		[2] 1,813,425		[2] 1,504,744
Coal ... short tons	2,325,840	7,667,000	2,842,673	9,042,000
Gypsum ... do	320,931	2,599,463	324,021	2,301,049
Lead ... do	79,946	13,910,604	69,704	11,152,640
Lime ... do	(1)	(1)	257	2,185
Mineral waters ... gallons sold	(3)	(3)	(3)	(3)
Natural gas ... M cubic feet	249,285,000	36,121,000	286,421,000	42,140,000
Natural-gas gasoline ... gallons	390,861,000	40,973,000	475,716,000	41,433,000
Ores (crude), etc.:				
Lead-zinc ... short tons	10,195,800	(4)	9,577,900	(4)
Zinc ... do	409,400	(4)	1,356,100	(4)
Petroleum ... barrels	176,768,000	348,230,000	179,195,000	413,900,000
Salt ... short tons			(1)	(1)
Sand and gravel ... do	1,626,758	958,657	1,556,175	978,590
Stone ... do	1,418,960	1,613,436	[5] 1,555,580	[5] 1,485,436
Tripoli ... do	(1)	(1)	6,799	111,054
Zinc ... do	283,371	43,072,392	272,567	40,885,050
Miscellaneous [6]		4,675,411		4,380,115
Total value, eliminating duplications		501,767,118		569,518,693

[1] Value included under "Miscellaneous."
[2] Figures obtained through cooperation with Bureau of the Census.
[3] No canvass.
[4] Not valued as ore; value of recoverable metal content included under the metals.
[5] Exclusive of sandstone, value for which is included under "Miscellaneous."
[6] Includes minerals indicated by "1" and "5" above.

Mineral production of Oregon in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Briquets, fuel.....short tons..	(1 2)	(1 2)	(1 2)	(1 2)
Cement.....barrels..	(1)	(1)	(1)	(1)
Clay products.....	-----	[3] [4] $839,286	-----	(1 3)
Clay, raw.....short tons..	(1 2)	(1 2)	473	[2] $1,009
Coal.....do....	(1)	(1)	(1)	(1)
Copper.....pounds..	106,325	15,098	296,454	41,504
Diatomite.....short tons..	(1)	(1)	(1)	(1)
Gems and precious stones.....	-----	(5)	-----	(5)
Gold.....troy ounces..	18,983	392,409	13,243	273,759
Gypsum.....short tons..	(1)	(1)	-----	-----
Lead.....do....	3	488	6	924
Lime.....do....	(1)	(1)	785	13,930
Mineral waters.....gallons sold..	(5)	(5)	(5)	(5)
Ores (crude), etc.:				
Copper.....short tons..	2,740	(6)	5,632	(6)
Dry and siliceous (gold and silver)...do....	24,743	(6)	16,095	(6)
Platinum and allied metals.....troy ounces..	89	18,858	44	5,264
Sand and gravel.....short tons..	2,990,845	1,998,545	2,568,730	1,530,794
Silver.....troy ounces..	32,793	22,758	29,733	18,553
Stone.....short tons..	1,690,930	1,858,644	2,139,910	2,152,512
Miscellaneous [7].....	-----	3,440,958	-----	3,585,199
Total value, eliminating duplications.....	-----	7,826,711	-----	6,941,355

[1] Value included under "Miscellaneous." [2] Value not included in total value for State.
[3] Figures obtained through cooperation with Bureau of the Census.
[4] Exclusive of pottery, value for which is included under "Miscellaneous."
[5] No canvass.
[6] Not valued as ore; value of recoverable metal content included under the metals.
[7] Includes minerals indicated by "1" and "4" above.

Mineral production of Pennsylvania in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Briquets, fuel.....short tons..	115,138	[1] $730,565	163,707	[1] $1,102,835
Cement.....barrels..	[2] 41,899,787	[2] 72,870,981	[2] 41,395,604	[2] 70,437,218
Clay products.....	-----	[3] 54,369,402	-----	[3] 55,041,270
Clay, raw.....short tons..	759,345	[1] 2,218,658	855,832	[1] 2,563,374
Coal:				
Anthracite.....do....	61,817,149	327,664,512	84,437,452	474,164,252
Bituminous.....do....	136,928,019	287,899,000	153,041,638	325,618,000
Coke.....do....	19,427,603	[1] 76,394,478	21,922,976	[1] 96,318,119
Copper [4].....pounds..	1,035,824	147,087	1,018,536	142,595
Feldspar (crude).....long tons..	1,330	4,722	1,484	4,492
Ferro-alloys.....do....	300,277	[1] 29,143,978	376,301	[1] 35,975,381
Gems and precious stones.....	-----	(5)	-----	(5)
Gold [4].....troy ounces..	237	4,900	22	450
Iron ore:				
Sold to furnaces.....long tons..	917,255	2,149,800	1,088,634	2,483,056
Sold for paint.....do....	2,293	(6)	2,215	(6)
Iron, pig.....do....	12,537,809	[1] 258,140,674	13,142,528	[1] 263,238,184
Lime.....short tons..	794,951	6,425,675	794,196	6,303,312
Mineral paints, zinc and lead pigments..do....	(1 6)	(1 6)	(1 6)	(1 6)
Mineral waters.....gallons sold..	(5)	(5)	(5)	(5)
Natural gas.....M cubic feet..	101,632,000	47,098,000	107,089,000	50,040,000
Natural-gas gasoline.....gallons..	18,850,000	2,185,000	20,343,000	2,454,000
Peat.....short tons..	(6)	(6)	(6)	(6)
Petroleum.....barrels..	8,097,000	29,310,000	8,961,000	31,930,000
Potassium salts.....short tons..	(6)	(6)	(6)	(6)
Sand and gravel.....do....	12,604,065	11,438,788	12,873,953	11,695,218
Sand and sandstone (finely ground).....do....	(6)	(6)	(6)	(6)
Sand-lime brick.....thousands..	(3 6)	(3 6)	(3 6)	(3 6)
Silica (quartz).....short tons..	(6)	(6)	(6)	(6)
Silver [4].....troy ounces..	3,120	2,165	544	339
Slate.....	-----	5,885,179	-----	5,413,177
Stone.....short tons..	[7] 16,124,590	[7] 18,870,945	[7] 16,628,770	[7] 19,157,336
Sulphuric acid (60° Baumé) [8].....do....	141,818	[1] 1,224,000	152,513	[1] 1,447,000
Talc.....do....	(6)	(6)	(6)	(6)
Tripoli (rottenstone).....do....	(6)	(6)	(6)	(6)
Miscellaneous [9].....	-----	14,636,386	-----	14,064,462
Total value, eliminating duplications.....	-----	867,196,142	-----	1,055,766,077

[1] Value not included in total value for State.
[2] Exclusive of natural cement, value for which is included under "Miscellaneous."
[3] Figures obtained through cooperation with Bureau of the Census.
[4] Copper, gold, and silver were recovered from pyritiferous magnetite. The quantity of such ore was 816,579 short tons in 1925 and 993,450 short tons in 1926; it is included in the figures shown for iron ore.
[5] No canvass. [6] Value included under "Miscellaneous."
[7] Exclusive of serpentine, value for which is included under "Miscellaneous."
[8] From zinc smelting. [9] Includes minerals indicated by "2", "6", and "7" above.

Mineral production of Rhode Island in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Clay products		(1 2)		(1 2)
Coke........short tons..	(1 3)	(1 3)	(1 3)	(1 3)
Graphite, amorphous........do....	(1)	(1)	(1)	(1)
Lime........do....	(1)	(1)	2,857	$42,535
Mineral waters........gallons sold..	(4)	(4)	(4)	(4)
Sand and gravel........short tons..	131,535	$45,157	381,856	90,538
Stone........do....	[5] 153,230	[5] 724,428	[5] 252,280	[5] 895,718
Miscellaneous [6]		1,803,150		1,446,495
Total value, eliminating duplications		1,151,857		1,339,398

[1] Value included under "Miscellaneous."
[2] Figures obtained through cooperation with Bureau of the Census.
[3] Value not included in total value for State.
[4] No canvass.
[5] Exclusive of limestone, value for which is included under "Miscellaneous."
[6] Includes minerals indicated by "1" and "5" above.

Mineral production of South Carolina in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Barite........short tons..	(1)	(1)	(1)	(1)
Clay products		[2] $1,906,241		[2 3] $1,869,420
Clay, raw........short tons..	55,725	[4] 634,278	62,173	[4] 660,442
Gold........troy ounces..			15	313
Marl, calcareous........short tons..	(1)	(1)	(1)	(1)
Mica:				
Scrap........do....	(1)	(1)	(1)	(1)
Sheet........pounds..	(1)	(1)	(1)	(1)
Mineral waters........gallons sold..	(5)	(5)	(5)	(5)
Phosphate rock........long tons..	2,147	8,051		
Sand and gravel........short tons..	511,497	227,996	513,698	231,802
Stone........do....	833,100	1,315,613	881,180	1,505,869
Miscellaneous [6]		49,903		69,805
Total value, eliminating duplications		3,507,804		3,677,209

[1] Value included under "Miscellaneous."
[2] Figures obtained through cooperation with Bureau of the Census.
[3] Exclusive of pottery, value for which is included under "Miscellaneous."
[4] Value not included in total value for State.
[5] No canvass.
[6] Includes minerals indicated by "1" and "3" above.

Mineral production of South Dakota in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Cement ... barrels	(1)	(1)	(1)	(1)
Clay products		(1 2)		(1 2)
Clay, raw ... short tons	1,045	[3] $9,680	1,810	[3] $17,800
Coal ... do	14,447	42,000	14,428	42,000
Columbite ... pounds			2,100	650
Feldspar (crude) ... long tons	(1)	(1)	(1)	(1)
Flint lining for tube mills ... short tons	2,400	30,000	(1)	(1)
Gems and precious stones		(4)		(4)
Gold ... troy ounces	289,747	5,989,604	279,529	5,778,376
Gypsum ... short tons	(1)	(1)	(1)	(1)
Lime ... do	(1)	(1)	(1)	(1)
Lithium minerals ... do	(1)	(1)	(1)	(1)
Mica:				
Scrap ... do	996	19,220	835	15,907
Sheet ... pounds	1,555	207	(1)	(1)
Mineral waters ... gallons sold	(4)	(4)	(4)	(4)
Natural gas ... M cubic feet	4,200	2,300	10,100	14,000
Ores (crude), etc.: Dry and siliceous (gold and silver) ... short tons	1,590,079	(5)	1,415,785	(5)
Pebbles for grinding ... do			1,900	22,000
Sand and gravel ... do	1,769,922	576,248	2,013,350	286,591
Sand-lime brick ... thousands	(1 2)	(1 2)	(1 2)	(1 2)
Silver ... troy ounces	96,133	66,716	82,186	51,284
Stone ... short tons	211,880	456,342	211,340	472,032
Tungsten ore (60 per cent concentrates) ... do			90	41,900
Miscellaneous[6]		789,013		870,618
Total value, eliminating duplications		7,971,650		7,595,358

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[1] Value included under "Miscellaneous."
[2] Figures obtained through cooperation with Bureau of the Census.
[3] Value not included in total value for State.
[4] No canvass.
[5] Not valued as ore; value of recoverable metal content included under the metals.
[6] Includes minerals indicated by "1" above.

Mineral production of Tennessee in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Aluminum ... pounds	(1 2)	(1 2)	(1 2)	(1 2)
Barite ... short tons	47,012	$345,038	20,910	$155,780
Bauxite ... long tons	(1)	(1)	(1)	(1)
Cement ... barrels	(1)	(1)	(1)	(1)
Clay products	...	[3, 4] 3,941,395	...	[3] 5,105,827
Clay, raw ... short tons	210,141	[2] 618,192	173,513	[2] 652,229
Coal ... do	5,454,011	10,077,000	5,788,741	10,975,000
Coke ... do	216,488	[2] 1,161,100	241,034	[2] 1,233,499
Copper ... pounds	19,788,234	2,809,929	18,606,664	2,604,933
Ferro-alloys ... long tons	19,122	[2] 1,324,957	(1 2)	(1 2)
Gold ... troy ounces	359	7,421	417	8,622
Iron ore:				
Sold to furnaces ... long tons	164,073	369,144	138,307	312,109
Sold for paint ... do	644	(1)	512	(1)
Iron, pig ... do	95,186	[2] 2,014,176	113,029	[2] 2,544,825
Iron sinter from copper sulphide ore ... do	4,884	(1)	38,881	(1)
Lead ... short tons	448	77,952	800	128,000
Lime ... do	175,685	1,344,508	173,363	1,319,303
Manganese ore ... long tons	352	8,800	1,555	(1)
Manganiferous ore ... do	(1)	(1)	953	(1)
Mineral waters ... gallons sold	(5)	(5)	(5)	(5)
Natural gas ... M cubic feet	8,500	2,000	11,500	1,900
Ores (crude), etc.:				
Copper ... short tons	794,930	(6)	608,040	(6)
Lead ... do	1,995	(6)	4,000	(6)
Zinc ... do	914,373	(6)	502,400	(6)
Petroleum ... barrels	24,000	53,000	43,000	100,000
Phosphate rock ... long tons	464,240	2,334,995	455,395	1,980,613
Sand and gravel ... short tons	1,966,730	1,533,251	2,254,350	1,751,336
Silver ... troy ounces	102,949	71,446	104,000	64,896
Slate	...	(1)	...	(1)
Stone ... short tons	[7] 1,835,150	[7] 4,334,891	[7] 1,693,080	[7] 4,170,016
Sulphuric acid (60° Baumé) [8] ... do	379,670	(1 2)	399,691	(1 2)
Tripoli ... do	(1)	(1)	(1)	(1)
Zinc ... do	16,256	2,470,912	12,098	1,814,700
Miscellaneous [9]	...	16,590,792	...	18,218,435
Total value, eliminating duplications	...	38,869,198	...	39,296,668

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[1] Value included under "Miscellaneous."

[2] Value not included in total value for State.

[3] Figures obtained through cooperation with Bureau of the Census.

[4] Exclusive of pottery, value for which is included under "Miscellaneous."

[5] No canvass.

[6] Not valued as ore; value of recoverable metal content included under the metals.

[7] Exclusive of sandstone, value for which is included under "Miscellaneous."

[8] From copper smelting.

[9] Includes minerals indicated by "1", "4", and "7" above.

Mineral production of Texas in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Asphalt (native)......short tons..	204, 530	$692, 730	289, 980	$825, 610
Cement......barrels..	4, 735, 521	8, 729, 046	5, 042, 359	9, 522, 701
Clay products......		[1] 6, 298, 045		[1] 6, 010, 981
Clay, raw......short tons..	4, 821	[2] 20, 247	2, 682	[2] 16, 754
Coal......do....	1, 008, 375	1, 566, 000	1, 091, 158	1, 751, 000
Copper......pounds..			12, 620	1, 767
Fuller's earth......short tons..	30, 462	310, 145	30, 258	300, 169
Gems and precious stones......		(3)		(3)
Gold......troy ounces..			110	2, 270
Graphite, crystalline......pounds..	(4)	(4)	(4)	(4)
Gypsum......short tons..	558, 132	3, 721, 954	533, 156	4, 126, 400
Lead......do....	8	1, 392	42	6, 711
Lime......do....	74, 638	698, 138	78, 293	706, 153
Marl, greensand......do....			(4)	(4)
Mercury......flasks..	(4)	(4)	(4)	(4)
Mineral waters......gallons sold..	(3)	(3)	(3)	(3)
Natural gas......M cubic feet..	134, 872, 000	19, 715, 000	175, 392, 000	28, 165, 000
Natural-gas gasoline......gallons..	214, 092, 000	22, 606, 000	243, 093, 000	22, 760, 000
Ores (crude), etc.:				
Copper......short tons..			61	(5)
Dry and siliceous (gold and silver)...do....	72, 685	(5)	33, 912	(5)
Lead......do....	52	(5)	69	(5)
Petroleum......barrels..	144, 648, 000	262, 270, 000	166, 916, 000	308, 700, 000
Salt......short tons..	(4)	(4)	(4)	(4)
Sand and gravel......do....	6, 093, 476	3, 478, 517	5, 383, 450	3, 187, 662
Sand-lime brick......thousands..	(1 4)	(1 4)	(1 4)	(1 4)
Silver......troy ounces..	552, 000	383, 088	447, 237	279, 076
Stone......short tons..	[6] 2, 503, 300	[6] 2, 076, 560	3, 117, 020	2, 595, 018
Sulphur......long tons..	(4)	(4)	(4)	(4)
Miscellaneous [7]......		18, 665, 014		31, 646, 212
Total value, eliminating duplications....		351, 211, 629		420, 586, 730

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[1] Figures obtained through cooperation with Bureau of the Census.
[2] Value not included in total value for State.
[3] No canvass.
[4] Value included under "Miscellaneous."
[5] Not valued as ore; value of recoverable metal content included under the metals.
[6] Exclusive of basalt and sandstone, value for which is included under "Miscellaneous."
[7] Includes minerals indicated by "4" and "6" above.

Mineral production of Utah in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Arsenious oxide……short tons	6,099	$365,940	[1] 3,756	[1] $236,753
Asphalt (native)……do	39,790	786,300	42,430	886,730
Cement……barrels	(2)	(2)	(2)	(2)
Clay products		[3] [4] 1,017,752		[3] [4] 929,782
Clay, raw……short tons	15,211	[5] 66,982	8,152	[5] 107,963
Coal……do	4,690,342	11,991,000	4,373,793	10,362,000
Coke……do	314,159	(2 5)	306,231	(2 5)
Copper……pounds	236,486,540	33,581,089	257,464,482	36,045,027
Gems and precious stones		(6)		(6)
Gold……troy ounces	177,803	3,675,516	182,763	3,778,046
Gypsum……short tons	(2)	(2)	36,333	195,535
Iron ore……long tons	268,529	361,251	296,943	411,611
Iron, pig……do	126,746	(2 5)	(2 5)	(2 5)
Lead……short tons	153,335	26,680,275	147,635	23,621,602
Lime……do	22,062	265,060	29,953	348,509
Manganese ore……long tons	50	(2)		
Manganiferous ore……do	1,162	(2)	(2)	(2)
Marl, calcareous……short tons	(2)	(2)		
Mineral soap……do	(2)	(2)	(2)	(2)
Ores (crude), etc.:				
Copper……do	12,575,265	(7)	13,949,866	(7)
Copper-lead and copper-lead-zinc……do	576	(7)		
Dry and siliceous (gold and silver)……do	389,030	(7)	301,213	(7)
Lead……do	699,361	(7)	383,857	(7)
Lead-zinc……do	814,691	(7)	1,218,635	(7)
Zinc……do	324	(7)	2,573	(7)
Petroleum……barrels	4,000	4,000	525	656
Potassium salts……short tons			(2)	(2)
Salt……do	88,150	432,846	77,350	422,317
Sand and gravel……do	466,449	189,122	1,100,918	227,574
Silver……troy ounces	21,276,689	14,766,022	19,358,581	12,079,755
Slate……short tons		(2)		
Stone……do	878,270	459,722	732,960	623,608
Sulphur……long tons	(2)	(2)	(2)	(2)
Uranium and vanadium ores……short tons	(2)	(2)	1,083	36,000
Zinc……do	26,306	3,998,492	47,590	7,138,454
Miscellaneous [8]		7,100,297		6,865,325
Total value, eliminating duplications		100,275,442		98,985,218

[1] Estimate by the Bureau of Mines.
[2] Value included under "Miscellaneous."
[3] Figures obtained through cooperation with Bureau of the Census.
[4] Exclusive of pottery, value for which is included under "Miscellaneous."
[5] Value not included in total value for State.
[6] No canvass.
[7] Not valued as ore; value of recoverable metal content included under the metals.
[8] Includes minerals indicated by "2" and "4" above.

Mineral production of Vermont in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Clay products		[1] $98,564		(1 2)
Clay, raw……short tons	1,733	[3] 9,444	2,027	[3] $11,364
Copper……pounds			473,200	66,248
Gold……troy ounces			2	41
Lime……short tons	66,245	788,936	56,378	677,944
Mineral waters……gallons sold	(4)	(4)	(4)	(4)
Ore (copper)……short tons			14,970	(5)
Sand and gravel……do	192,227	35,608	141,554	25,535
Scythestones……do	(2)	(2)	(2)	(2)
Silver……troy ounces			1,965	1,227
Slate		3,963,025		4,267,041
Stone……short tons	[6] 283,030	[6] 8,958,846	330,230	9,244,465
Talc……do	54,883	533,603	53,510	514,527
Miscellaneous [7]		30,351		158,133
Total value, eliminating duplications		14,408,933		14,955,161

[1] Figures obtained through cooperation with Bureau of the Census.
[2] Value included under "Miscellaneous."
[3] Value not included in total value for State.
[4] No canvass.
[5] Not valued as ore; value of recoverable metal content included under the metals.
[6] Exclusive of sandstone, value for which is included under "Miscellaneous."
[7] Includes minerals indicated by "2" and "6" above.

Mineral production of Virginia in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Barite .... short tons..	(1)	(1)	(1)	(1)
Briquets, fuel .... do....	(1 2)	(1 2)	63,862	[2] $495,791
Cement .... barrels..	(1)	(1)	(1)	(1)
Clay products	....	[3] [4] $3,909,634	....	[3] [4] 3,755,980
Clay, raw .... short tons..	20,963	[2] 163,857	29,945	[2] 243,197
Coal .... do....	12,799,443	23,496,000	14,133,386	27,203,000
Coke .... do....	421,691	[2] 1,901,623	370,983	[2] 1,716,716
Feldspar (crude) .... long tons..	(1)	(1)	(1)	(1)
Ferro-alloys .... do....	(1 2)	(1 2)	(1 2)	(1 2)
Gold .... troy ounces..	3	68	11	220
Gypsum .... short tons..	(1)	(1)	(1)	(1)
Iron ore .... long tons..	76,302	174,454	49,703	162,446
Iron, pig .... do....	97,884	[2] 2,237,749	105,019	[2] 2,322,451
Lead .... short tons..	2,229	387,846	2,450	392,000
Lime .... do....	192,429	1,491,568	188,696	1,453,095
Manganese ore .... long tons..	3,121	99,981	3,792	(1)
Manganiferous ore .... do....	1,800	(1)	2,135	(1)
Marl, calcareous .... short tons..	31,114	70,354	23,927	48,943
Mica:				
Scrap .... do....	(1)	(1)	(1)	(1)
Sheet .... pounds..	(1)	(1)	(1)	(1)
Millstones	....	(1)	....	15,295
Mineral waters .... gallons sold..	(5)	(5)	(5)	(5)
Ores (crude), etc.:				
Dry and siliceous (gold and silver) .... short tons..	15	(6)	....	....
Lead-zinc .... do....	120,459	(6)	144,300	(6)
Pyrites .... long tons..	(1)	(1)	(1)	(1)
Salt .... short tons..	(1)	(1)	(1)	(1)
Sand and gravel .... do....	2,170,000	1,491,274	1,791,198	1,225,693
Sand and sandstone (finely ground) .... do....	(1)	(1)	(1)	(1)
Silica (quartz) .... do....	....	....	(1)	(1)
Silver .... troy ounces..	5	4	....	....
Slate	....	[7] 377,082	....	[7] 331,651
Stone .... short tons..	[8] 2,670,660	[8] 3,224,259	[8] 3,047,220	[8] 3,504,671
Talc and soapstone .... do....	(1)	(1)	(1)	(1)
Titanium minerals:				
Ilmenite .... do....	....	....	(1)	(1)
Rutile .... do....	....	....	(1)	(1)
Zinc .... do....	2,732	415,264	5,830	874,500
Miscellaneous [9]	....	7,726,331	....	9,114,955
Total value, eliminating duplications	....	41,038,393	....	46,136,458

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[1] Value included under "Miscellaneous."

[2] Value not included in total value for State.

[3] Figures obtained through cooperation with Bureau of the Census.

[4] Exclusive of pottery, value for which is included under "Miscellaneous."

[5] No canvass.

[6] Not valued as ore; value of recoverable metal content included under the metals.

[7] Exclusive of granules, etc., value for which is included under "Miscellaneous."

[8] Exclusive of marble, value for which is included under "Miscellaneous."

[9] Includes minerals indicated by "1", "4", "7", and "8" above.

Mineral production of Washington in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Briquets, fuel short tons	(1 2)	(1 2)	(1 2)	(1 2)
Cement barrels	2,499,237	$5,523,324	(1)	(1)
Clay products		[3] 2,619,250		[3] $2,583,333
Clay, raw short tons	24,170	[2] 43,645	12,947	[2] 31,515
Coal do	2,537,890	9,176,000	2,586,568	9,350,000
Coke do	79,257	[2] 617,265	67,286	[2] 518,053
Copper pounds	1,159,057	164,586	1,351,890	189,265
Diatomite short tons	(1)	(1)	140	1,400
Gold troy ounces	11,138	230,253	9,341	193,092
Gypsum short tons	(1)	(1)		
Iron ore long tons	830	(1)	1,702	(1)
Lead short tons	2,814	489,570	2,273	363,698
Lime do	29,636	357,297	23,783	298,014
Magnesite do	56,060	560,600	79,560	596,700
Magnesium sulphate (natural) pounds	(1)	(1)	(1)	(1)
Manganese ore long tons	8,113	(1)	3,162	(1)
Mercury flasks			489	44,941
Mineral waters gallons sold	(4)	(4)	(4)	(4)
Ores (crude), etc.:				
Copper short tons	19,500	(5)	25,297	(5)
Dry and siliceous (gold and silver) do	15,383	(5)	17,599	(5)
Lead do	11,518	(5)	7,659	(5)
Lead-zinc do	240	(5)	603	(5)
Zinc do	3,646	(5)	3,185	(5)
Pulpstones do	(1)	(1)	(1)	(1)
Rubbing stones do			(1)	(1)
Sand and gravel do	4,197,660	1,763,153	3,910,577	1,704,234
Silica (quartz) do	(1)	(1)	(1)	(1)
Silver troy ounces	166,425	115,499	171,649	107,109
Sodium sulphate from natural sources short tons			(1)	(1)
Stone do	576,690	1,042,165	[6] 461,570	[6] 979,482
Zinc do	609	92,556	522	78,327
Miscellaneous [7]		1,009,414		5,324,668
Total value, eliminating duplications		22,382,132		21,256,952

[1] Value included under "Miscellaneous."
[2] Value not included in total value for State.
[3] Figures obtained through cooperation with Bureau of the Census.
[4] No canvass.
[5] Not valued as ore; value of recoverable metal content included under the metals.
[6] Exclusive of marble, value for which is included under "Miscellaneous."
[7] Includes minerals indicated by "1" and "6" above.

Mineral production of West Virginia in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Briquets, fuel short tons	(1 2)	(1 2)	(1 2)	(1 2)
Bromine pounds	103,310	$34,207	87,870	$26,672
Calcium chloride short tons	5,930	51,785	4,960	55,208
Cement barrels	(1)	(1)	(1)	(1)
Clay products		[3] 15,293,371		[3] 16,121,172
Clay, raw short tons	68,853	[2] 135,751	63,446	[2] 113,007
Coal do	122,380,959	209,655,000	143,509,340	264,736,000
Coke do	1,546,032	[2] 6,648,745	1,713,461	[2] 6,918,103
Ferro-alloys long tons	(1 2)	(1 2)	(1 2)	(1 2)
Grindstones and pulpstones short tons	6,850	590,796	7,082	630,440
Iron, pig long tons	499,047	[2] 9,416,095	364,302	(1 2)
Lime short tons	270,895	1,879,223	267,464	1,719,590
Marl, calcareous do	17,434	53,219	(1)	(1)
Mineral waters gallons sold	(4)	(4)	(4)	(4)
Natural gas M cubic feet	180,345,000	70,903,000	180,223,000	76,396,000
Natural-gas gasoline gallons	58,201,000	6,759,000	63,807,000	7,706,000
Petroleum barrels	5,763,000	20,055,000	5,946,000	20,560,000
Salt short tons	25,870	180,053	23,180	170,953
Sand and gravel do	2,475,689	3,083,115	2,563,113	3,095,743
Sand and sandstone (finely ground) do	(1)	(1)	(1)	(1)
Stone do	3,348,200	3,349,143	3,211,650	3,402,327
Sulphuric acid [5] do	(1 2)	(1 2)	(1 2)	(1 2)
Miscellaneous [6]		2,241,711		9,330,154
Total value, eliminating duplications		333,527,697		395,941,940

[1] Value included under "Miscellaneous."
[2] Value not included in total value for State.
[3] Figures obtained through cooperation with Bureau of the Census.
[4] No canvass.
[5] From zinc smelting.
[6] Includes minerals indicated by "1" above.

Mineral production of Wisconsin in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Barite ... short tons	(1)	(1)	(1)	(1)
Briquets, fuel ... do	(1 2)	(1 2)	(1 2)	(1 2)
Cement ... barrels	(1)	(1)	(1)	(1)
Clay products	------------	[3, 4] $1, 180, 496	------------	(1 3)
Clay, raw ... short tons	390	[2] 904	220	[2] $220
Coke ... do	(1 2)	(1 2)	(1 2)	(1 2)
Iron ore:				
Sold to furnaces ... long tons	933, 214	2, 260, 388	1, 238, 885	3, 178, 156
Sold for paint ... do	2, 213	6, 105	1, 736	4, 535
Iron, pig ... do	226, 712	[2] 4, 836, 952	235, 597	[2] 5, 034, 012
Lead ... short tons	1, 877	326, 598	1, 546	247, 360
Lime ... do	244, 903	2, 204, 504	216, 414	1, 896, 772
Manganiferous ore ... long tons	404, 014	(1)	------------	------------
Marl, calcareous ... short tons	358	2, 967	------------	------------
Mineral paints, zinc and lead pigments ... short tons	(1 2)	(1 2)	(1 2)	(1 2)
Mineral waters ... gallons sold	(5)	(5)	(5)	(5)
Ores (crude), etc.:				
Lead-zinc ... short tons	711, 600	(6)	1, 078, 500	(6)
Zinc ... do	292, 100	(6)	361, 800	(6)
Pyrites ... long tons	40	160	------------	------------
Sand and gravel ... short tons	6, 181, 822	2, 603, 672	7, 977, 261	3, 264, 271
Sand-lime brick ... thousands	(1 3)	(1 3)	(1 3)	(1 3)
Silica (quartz) ... short tons	(1)	(1)	(1)	(1)
Stone ... do	[7] 2, 541, 360	[7] 4, 208, 201	[7] 2, 852, 070	[7] 4, 937, 661
Sulphuric acid [8] ... do	(1 2)	(1 2)	(1 2)	(1 2)
Zinc ... do	20, 230	3, 074, 960	26, 800	4, 020, 000
Miscellaneous [9]	------------	13, 037, 665	------------	14, 277, 716
Total value, eliminating duplications	------------	19, 205, 380	------------	20, 711, 736

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[1] Value included under "Miscellaneous."
[2] Value not included in total value for State.
[3] Figures obtained through cooperation with Bureau of the Census.
[4] Exclusive of pottery, value for which is included under "Miscellaneous."
[5] No canvass.
[6] Not valued as ore; value of recoverable metal content included under the metals.
[7] Exclusive of basalt and unclassified stone in 1925 and of basalt in 1926, value for which is included under "Miscellaneous."
[8] From zinc smelting.
[9] Includes minerals indicated by "1", "4", and "7" above.

Mineral production of Wyoming in 1925 and 1926

Product	1925		1926	
	Quantity	Value	Quantity	Value
Clay products	------------	[1] $99, 771	------------	(1 2)
Clay, raw ... short tons	2, 584	[3] 63, 657	4, 409	[3] $96, 853
Coal ... do	6, 553, 232	18, 275, 000	6, 512, 288	17, 827, 000
Gypsum ... do	(2)	(2)	(2)	(2)
Iron ore ... long tons	489, 622	(2)	630, 387	(2)
Lime ... short tons	------------	------------	(2)	(2)
Mineral waters ... gallons sold	(4)	(4)	(4)	(4)
Natural gas ... M cubic feet	45, 539, 000	4, 149, 000	46, 567, 000	4, 669, 000
Natural-gas gasoline ... gallons	32, 777, 000	3, 227, 000	40, 625, 000	3, 934, 000
Petroleum ... barrels	29, 173, 000	51, 467, 000	25, 776, 000	51, 020, 000
Phosphate rock ... long tons	6, 697	30, 000	4, 464	29, 000
Sand and gravel ... short tons	586, 450	192, 137	941, 292	139, 273
Sodium salts (carbonate and sulphate) from natural sources ... short tons	(2)	(2)	(2)	(2)
Stone ... do	[5] 133, 410	[5] 245, 058	153, 940	316, 463
Miscellaneous [6]	------------	1, 069, 949	------------	1, 053, 330
Total value, eliminating duplications	------------	78, 754, 915	------------	78, 988, 066

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[1] Figures obtained through cooperation with Bureau of the Census.
[2] Value included under "Miscellaneous."
[3] Value not included in total value for State.
[4] No canvass.
[5] Exclusive of sandstone, value for which is included under "Miscellaneous."
[6] Includes minerals indicated by "2" and "5" above.

PREFATORY NOTE TO THE REPORTS ON GOLD, SILVER, COPPER, LEAD, AND ZINC

By Frank J. Katz

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In the mining industry, gold, silver, copper, lead, and zinc are closely related in both the genesis and the geologic occurrence of their ores, as well as in mining and in metallurgical treatment. Of their ores some contain all five metals, many contain three or four, and few contain only one. Gold and silver, for instance, almost everywhere show close genetic relations, and their ores are usually mined together. Lead and zinc constitute a similar pair. Copper ores almost invariably yield some silver and gold as well as copper, and most lead ores yield notable supplies of silver. Zinc ores in the Western States contribute also to the production of silver. All five metals may occur in commercial quantity in a single mine or, more commonly, in a single mining district. For these reasons each of these metals is treated in Mineral Resources in a general report, and all five metals are grouped together in "mine reports" descriptive of individual or geographically grouped States. These reports are printed in 15 pamphlets.

To facilitate advance publication each report is published separately at the earliest date possible. The general reports give figures of the output of the metals in the first marketable form, as obtained from the smelters, refineries, and mints, together with general reviews of the respective industries for the entire country. The figures given in the general reports represent the final official statistics of production for the country and of the States. The general report on gold and silver includes the statistics of recovered precious metals as determined by the Bureau of the Mint. The "mine reports" give figures of the production (called "mine production") as obtained from the mines, so far as possible in terms of recoverable metal in ores and other material sold or treated during the year; they also supply information in detail relative to the mining industry in the respective States, counties, and mining districts.

These reports, which appear as separate chapters in this volume, are as follows:

Gold and silver (general report).
Copper(general report).
Lead (general report).
Zinc (general report).
Silver, copper, lead, and zinc in the Central States (mine report).
Gold, silver, copper, lead, and zinc in the Eastern States (mine report).

Gold, silver, copper, lead, and zinc in Arizona (mine report).
Gold, silver, copper, lead, and zinc in California and Oregon (mine report).
Gold, silver, copper, lead, and zinc in Colorado (mine report).
Gold, silver, copper, lead, and zinc in Idaho and Washington (mine report).
Gold, silver, copper, lead, and zinc in Montana (mine report).
Gold, silver, copper, lead, and zinc in Nevada (mine report).
Gold, silver, copper, lead, and zinc in New Mexico and Texas (mine report).
Gold, silver, copper, and lead in South Dakota and Wyoming (mine report).
Gold, silver, copper, lead, and zinc in Utah (mine report).

In stating quantity of ores, concentrates, and similar material the short ton of 2,000 pounds is used throughout. The term "ore" as used here denotes any metalliferous material treated at the mine or shipped to reduction plants and paid for by those plants, whether or not it nets a profit to the miner. The ore classification is necessarily arbitrary, because of the varying factors affecting mining and treatment of ores. Dry and siliceous ores comprise gold and silver ores proper, as well as fluxing ores that carry considerable quantities of iron and manganese oxides and very small quantities of gold and silver and also gold and silver ores that carry copper, lead, or zinc in quantities too low to classify them as copper, lead, zinc, or mixed ores. The copper ores include the great disseminated copper deposits of the West, the copper ores of the Lake Superior region, and other ores in which copper is the most abundant base metal paid for. The lead and zinc ores are those in which lead or zinc is the only or chief base metal present, irrespective of their precious-metal content. The mixed ores are those whose commercial value depends on the recoverable or recovered contents of two or more base metals in addition to any precious metals they may contain. If one of the metals, though present in sufficient quantity, is not recovered, that metal is disregarded in naming the ore. An improvement in metallurgy may later serve to change the name of such ore. The classification based on methods of treatment is the only satisfactory commercial classification.

It is to be understood, of course, that market values are not received by producers for metals in ore and intermediate products nor always for metals in marketable form, that payment is made in accordance with contracts for treatment or sale, and therefore that average daily quotations do not necessarily agree with average prices received.

Prices of silver, copper, lead, and zinc, 1850–1926

Year	Silver [1]	Copper [2]	Lead [3]	Zinc [4]
	Per fine ounce	*Per pound*	*Per pound*	*Per pound*
1850	$1.32	$0.22	$0.05	----------
1851	1.34	.166	.05	----------
1852	1.33	.22	.05	----------
1853	1.35	.22	.06	$0.055
1854	1.35	.22	.06	----------
1855	1.34	.27	.07	----------
1856	1.34	.27	.066	----------
1857	1.35	.25	.06	----------
1858	1.34	.23	.06	----------
1859	1.36	.22	.055	----------
1860	1.35	.23	.056	----------
1861	1.33	.22	.05	----------
1862	1.35	.22	.06	----------
1863	1.345	.34	.06	----------
1864	1.345	.47	.07	.139
1865	1.337	.392	.066	----------
1866	1.339	.342	.07	----------
1867	1.33	.254	.065	----------
1868	1.326	.23	.065	----------
1869	1.325	.242	.06	----------
1870	1.328	.212	.06	----------
1871	1.325	.241	.06	----------
1872	1.322	.356	.064	----------
1873	1.297	.280	.06	----------
1874	1.278	.220	.06	----------
1875	1.24	.227	.058	.07
1876	1.16	.21	.061	.072
1877	1.20	.19	.055	.06
1878	1.15	.166	.036	.049
1879	1.12	.186	.041	.052
1880	1.15	.214	.05	.055
1881	1.13	.182	.048	.052
1882	1.14	.191	.049	.053
1883	1.11	.165	.043	.045
1884	1.11	.13	.037	.044
1885	1. 7	.108	.040	.043
1886	.99	.111	.046	.044
1887	.98	.138	.045	.046
1888	.94	.168	.044	.049
1889	$0.94	$0.135	$0.039	$0.05
1890	1.05	.156	.045	.055
1891	.99	.128	.043	.05
1892	.87	.116	.041	.046
1893	.78	.108	.037	.04
1894	.63	.095	.033	.035
1895	.65	.107	.032	.036
1896	.68	.108	.03	.039
1897	.60	.12	.036	.041
1898	.59	.124	.038	.046
1899	.60	.171	.045	.058
1900	.62	.166	.044	.044
1901	.60	.167	.043	.041
1902	.53	.122	.041	.048
1903	.54	.137	.042	.054
1904	.58	.128	.043	.051
1905	.61	.156	.047	.059
1906	.68	.193	.057	.061
1907	.66	.20	.053	.059
1908	.53	.132	.042	.047
1909	.52	.13	.043	.054
1910	.54	.127	.044	.054
1911	.53	.125	.045	.057
1912	.615	.165	.045	.069
1913	.604	.155	.044	.056
1914	.553	.133	.039	.051
1915	.507	.175	.047	.124
1916	.658	.246	.069	.134
1917	.824	.273	.086	.102
1918	1.00	.247	.071	.091
1919	1.12	.186	.053	.073
1920	1.09	.184	.08	.081
1921	1.00	.129	.045	.05
1922	1.00	.135	.055	.057
1923	.82	.147	.07	.068
1924	.67	.131	.08	.065
1925	.694	.142	.087	.076
1926	.624	.14	.08	.075

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[1] Report of Director of the Mint, pp. 212–213, 1914. Equivalent value of fine ounce based on average price and average rate of exchange. For 1916, 1917, and 1919, dealers' buying price, New York. For 1918, average price as stated by the Bureau of the Mint. For 1920 to 1922, New York market price for domestic silver only. For 1923, average price under Pittman Act, from Jan. 1 to June 2, for domestic silver; average New York price for all silver after that period. For 1924 to 1926, average New York price for bar silver.

[2] Weed, W. H., Copper Handbook, vol. 11, pp. 1339, 1343, for years 1850–1903. By computation from data for years 1850–1860, p. 1339. U. S. Geological Survey computations for electrolytic copper since 1904. For 1916 and later years, average price all marketable grades.

[3] New York price, Ingalls, W. R., Lead and zinc in the United States, p. 203, 1908. U. S. Geological Survey since 1904. For 1916, outside spot quotations, New York. For 1917 and later years, average price all grades.

[4] New York price, 1875–1904, Ingalls, W. R., Lead and zinc in the United States, p. 342, 1908. St. Louis price, U. S. Geological Survey, since 1904. For 1915 and later years, average price all grades. Oral communication from C. E. Siebenthal, of the U. S. Geological Survey, for 1853 and 1864.

CHROMITE

By J. W. Furness[1]

DOMESTIC SITUATION

In 1926 the shipments of domestic chromite containing 38 per cent or more chromic oxide totaled 141 long tons, valued at $2,079. In 1925 the domestic shipments of ore containing 45 per cent or more of chromic oxide totaled 108 tons, valued at $2,105. The total imports containing 45 per cent or more chromic oxide in 1926 were 215,464 long tons, valued at $1,704,947, as compared with 149,739 tons, valued at $1,207,420, imported in 1925.

During the last five years imports of chromite have increased greatly. In 1926 they were more than two and a half times as large as in 1921. By far the greater part of this increase has been due to the demand created by the utilization of chromite in the manufacture of refractories, although part of the increase may be attributed to wider use in the manufacture of steel. Some of the larger manufacturers of refractories have reported that during the last three years their sales of chromite brick and chromite cements have increased 500 per cent. Before 1922 the consumption of magnesite in the manufacture of refractories far exceeded that of chromite.

Prior to the war period (1914 to 1918) the United States depended largely upon imports for the magnesite needed. The war developments led to the belief in some quarters that the domestic mines could furnish at a price the major part of the domestic consumption of magnesite. Under the tariff act of 1922 (H. R. 7456), duties were placed upon magnesia calcined (par. 50), clay supporters (par. 215), magnesite brick (par. 201), caustic calcined (par. 204), crude, grained, dead-burned, etc. (par. 204), magnesium alloys, powder, sheets, etc. (par. 375), carbonates, chloride, oxide, etc. (par. 50), manufactures not otherwise specified (par. 375), and metallic (par. 375). Paragraphs 201 and 204 read as follows:

> Bath brick, chrome brick, and fire brick not specially provided for, 25 per centum ad valorem; magnesite brick, three-fourths of 1 cent per pound and 10 per centum ad valorem; crude magnesite, five-sixteenths of 1 cent per pound; caustic calcined magnesite, five-eighths of 1 cent per pound; dead-burned and grain magnesite, not suitable for manufacture into oxychloride cements, twenty-three fortieths of 1 cent per pound.

Except chromite and chromic acid, all compounds of chromium are dutiable. During the years 1923 to 1926 the New York price of chromite as quoted by the Engineering and Mining Journal has averaged about $21 per long ton, 50 per cent tenor, and has been materially less than the price of dead-burned magnesite. Hence, the trend toward substitution of chromite for magnesite refractories.

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[1] The statistics on domestic production were prepared by H. M. Meyer, and the data on imports were compiled from records of the Bureau of Foreign and Domestic Commerce, by J. A. Dorsey, both of the Bureau of Mines.

Under conditions of service, chromite brick and magnesite brick have given results so nearly similar that the superiority of one material over the other has not definitely been determined. Users of these refractories have become more familiar with chromite bricks and have found them so eminently satisfactory that it seems doubtful if magnesite brick sold at a price equivalent to chromite brick would materially replace chromite brick in the present market. The increased consumption of chromite as a refractory may therefore be attributed to the artificial raising of the price of magnesite and the introduction by the trade of a substitute that is cheaper and, although it does not completely duplicate the characteristics of magnesite in brick, satisfies the trade demand.

CHROMITE MINING IN THE UNITED STATES

Crude chromite mined and shipped from mines in the United States, 1921–1926, by States

State	Ore containing 45 per cent or more of chromic oxide			Ore containing 35 to 45 per cent of chromic oxide			Total value
	Mined (long tons)	Shipped (long tons)	Value	Mined (long tons)	Shipped (long tons)	Value	
1921							
California	91	68	$1,162		55	$124	$1,286
Oregon				159	159	1,614	1,614
	91	68	1,162	159	214	1,738	2,900
1922							
California	200	163	3,354				3,354
Maryland	113	113	3,302				3,302
Montana				10			
Oregon	97	79	632				632
	410	355	7,288	10			7,288
1923							
California	69	69	1,415				1,415
Maryland	90	80	1,840				1,840
Montana				22			
Oregon	78	78	564	313			564
	237	227	3,819	335			3,819
1924							
California	213	188	940				940
Montana				20			
Oregon					[1] 100	[1] 200	[1] 200
	213	188	940	20	[1] 100	[1] 200	[1] 1,140
1925							
California	83	83	1,650				1,650
Maryland	25	25	455				455
Oregon				47			
Washington	2						
	110	108	2,105	47			2,105
1926							
California	127	47	957		44	22	979
Maryland	67	50	1,100				1,100
	194	97	2,057		44	22	2,079

[1] Ore from Oregon in 1924 contained less than 35 per cent Cr_2O_3.

IMPORTS

Crude chromite imported into the United States, 1921–1926, in long tons

[General imports]

Country	1921	1922	1923	1924	1925	1926	
						Quantity	Value
Africa:							
British—							
East					678	1,000	$9,209
South	23,318	41,002	52,153	21,642	18,463	17,794	125,947
Portuguese—							
East		7,100	15,591	37,152	70,718	105,022	665,862
Other		4,000		26,287	6,805	7,724	56,978
Australia		4,000					
Brazil						1,840	16,280
Canada	7,554	801	3,401				
Cuba	600	1	10,420	8,145	29,830	36,020	277,057
England		1,900	(1)		[2] 20		
Greece	8,104	8,600	10,550	13,390	12,533	21,065	261,491
Guatemala	401					53	964
India (British)	928	12,677	29,238	7,335	8,360	13,800	173,343
Japan					300		
Oceania (French)	35,108	7,500	7,410	4,392	2,032	11,146	117,816
Turkey in Asia	5,822	[3] 2,500					
Turkey in Europe	1						
	81,836	90,081	128,763	118,343	149,739	215,464	1,704,947

[1] Quantity not recorded.
[2] Recorded as United Kingdom in 1925.
[3] Recorded by Bureau of Foreign and Domestic Commerce as Greece in Asia.

Ferrochrome or ferrochromium, chrome or chromium metal, and chromium vanadium imported for consumption in the United States, September 22, 1922, to December 31, 1926, in long tons

	Sept. 22–Dec. 31, 1922 [1]	1923	1924	1925	1926
Ferrochrome or ferrochromium:					
Containing 3 per cent or more of carbon (chromium content)		1,116	30	69	15
Containing less than 3 per cent of carbon, gross weight	4	295	436	588	495
Chrome or chromium metal	3	13	2	3	1
Chromium vanadium		57		32	20

[1] The imports for Jan. 1–Sept. 21, 1922, were recorded as 390 long tons of chrome or chromium and ferrochrome or ferrochromium.

Chromium compounds imported for consumption in the United States, 1919–1926

Year	Chromic acid			Chromate and bichromate of potash			Chromate and bichromate of soda			Chromium chloride and sulphate		
	Pounds	Value		Pounds	Value		Pounds	Value		Pounds	Value	
		Total	Average		Total	Average		Total	Average		Total	Average
1919				15,450	$4,271	$0.28				(1)	(1)	(1)
1920	1,100	$90	$0.08	4,414	2,690	.61				(1)	(1)	(1)
1921	1,969	674	.34	73,011	6,772	.09	64,236	$5,308	$0.08	(1)	(1)	(1)
1922	4,663	1,289	.28	8,584	1,676	.20	22,731	1,540	.07	(1)	(1)	(1)
1923	4,632	2,026	.44	5,563	1,033	.19	245	73	.30	2,771	$654	$0.24
1924	32,493	2,484	.08	10,486	1,924	.18				9,095	1,340	.15
1925	5,564	2,216	.40	4,379	778	.18	221	46	.21	3,520	941	.27
1926	7,220	2,892	.40	8,177	1,449	.18	220	44	.20	1,310	693	.53

[1] Not separately classified prior to change in tariff, Sept. 22, 1922. None recorded Sept. 22 to Dec. 31, 1922.

Domestic sales, imports, and supply of chromite in the United States, 1919–1926

Year	Sales from domestic mines			Imports (general)			Apparent available supply		
	Long tons	Value		Long tons	Value		Long tons	Value	
		Total	Average		Total	Average		Total	Average
1919	5,079	$129,302	$25.46	61,404	$1,381,497	$22.50	66,483	$1,510,799	$22.72
1920	2,502	44,857	17.93	150,275	1,921,824	12.79	152,777	1,966,681	12.87
1921	282	2,900	10.28	81,836	654,602	8.00	82,118	657,502	8.01
1922	355	7,288	20.53	90,081	741,186	8.23	90,436	748,474	8.28
1923	227	3,819	16.82	128,763	1,123,120	8.72	128,990	1,126,939	8.74
1924	288	1,140	3.96	118,343	1,095,603	9.26	118,631	1,096,743	9.24
1925	108	2,105	19.49	149,739	1,207,420	8.06	149,847	1,209,525	8.07
1926	141	2,079	14.74	215,464	1,704,947	7.91	215,605	1,707,026	7.92

PRICES

The increased demand for chromite during 1926 did not materially affect prices. As the mineralized areas of South Africa are more thoroughly prospected, larger reserves of chromite are indicated. The larger part of the South African production comes from the Selukwe district, Southern Rhodesia. At the end of 1925 there were 64,000 chromite claims located as against 30,000 in 1923 and 43,000 in 1924.[2] The relative abundance of the mineral from a world standpoint and the latent possibility of production from such countries as New Caledonia and northern Asia Minor assist in maintaining a relatively constant price.

The New York prices of chromite, on the basis of 50 per cent Cr_2O_3, from 1913 to 1926 were as follows, according to the Engineering and Mining Journal:

Quoted prices per long ton of chromite at New York, 1913–1926

1913	$11.19	1920	$17.93
1914	14.75	1921	10.28
1915	11.20	1922	22.53
1916	15.44	1923	19.00
1917	24.00	1924	21.35
1918	44.99	1925	21.92
1919	17.25	1926	22.46

WORLD'S PRODUCTION

Production of crude chromite, 1922–1926, by countries, in metric tons [a]

Country	1922	1923	1924	1925	1926
Australia	537	1,211	785	978	([b])
Canada	696	3,228	------	------	------
Cuba	------	[c] 10,587	[d] 19,881	[c] 30,309	[c] 36,598
Cyprus [e]	------	------	2,856	2,021	524
Great Britain	605	555	1,060	455	([b])
Greece	9,213	14,828	14,651	[f] 14,000	([b])
Guatemala	------	------	------	------	[c] 54
India	23,143	55,113	46,192	38,053	([b])
Japan	3,757	4,526	5,362	5,823	([b])
New Caledonia [e]	19,374	23,220	23,021	34,732	([b])
Rhodesia, Southern	84,799	87,702	156,692	123,220	164,376
Rumania	30	60	------	------	([b])
Russia [g]	847	3,004	7,266	30,670	([b])
Turkey (Asia Minor)	[f] 2,540	([b])	([b])	7,506	([b])
Union of South Africa	87	------	4,572	13,756	[h] 13,590
United States (shipments)	361	231	293	110	143
Yugoslavia	15	([b])	300	12,160	([b])
	146,004	204,265	282,931	313,793	([b])

[a] Compiled by L. M. Jones, of the Bureau of Mines.
[b] Data not available.
[c] Imports into the United States.
[d] Production of the Caledonia mine.
[e] Exports.
[f] Approximate production.
[g] Data for year ended Sept. 30.
[h] Sales and shipments.

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[2] South African Mining and Engineering Journal: Sept. 11, 1926, p. 39.

METALLURGICAL USES

As the physical qualities imparted to steel and iron by the addition of chromium have become better known, the uses to which the various alloys can be put have expanded rapidly. During 1926 a corporation known as the Chromium Corporation of America was organized to take over the patents of the chromium-plating processes developed by the Chemical Treatment Co. and the Chromium Products Corporation, the latter a subsidiary of the Metal Thermit Corporation. The chairman of the board of the new corporation, John T. Pratt, in his address to the board of directors, said:

> Manufacturers of metal products have followed with a great deal of interest the rapid development of chrome plating during the past few years. Knowing the properties of chromium, particularly its extreme hardness and ability to resist acids, high temperatures and all sources of tarnish, corrosion, or discoloration, they have felt that it would only be a matter of time before chrome plating would become a standard finish for many types of metal products.[3]

Research work on chromium plating has been very active.[4]

W. H. Hatfield, in a paper read at a joint meeting of the Chemical Engineering Group, the British Chemical Plant Manufacturers Association, and the Institute of Metals at the Congress of Chemists, London, July 20, 1926, presented a table showing the comparative resistance of mild steel, chromium steel, and chromium-nickel steel to various media. This table is appended.

In the fabrication of the heavy-duty machinery desired by steel manufacturers chromium is largely used as one of the alloy metals. The chromium imparts to such steel durable properties necessary where high-speed machinery is required. Chromium gives a noncorrosive quality to the metals with which it alloys. Rustless iron, stainless steel, and chrome iron, with a tenor of 10 per cent and more of chromium, successfully resist corrosion. The most resistant of the three to high-temperature oxidation is chrome iron. Among the nonferrous alloys of chromium some of the important are those of chromium and nickel. Nickel chrome is used in the manufacture of electric heating devices and is resistant to high-temperature oxidation and chemical corrosion. Stellite, an alloy of chromium, cobalt, and tungsten, is used in the manufacture of high-speed tool steels, precision gauges, and instruments.

The chromium content in chrome steel and chrome iron ranges from 10 per cent to 18 per cent and depends largely upon the use to which the alloy is to be put. The difference between chrome steel and chrome iron lies in the carbon content. Alloys containing more than 0.12 per cent carbon are known as chrome steels and those having a carbon content less than 0.12 per cent are known as chrome iron.

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[3] Press release, July 20, 1926, John T. Pratt, New York.

[4] Franks, Colin, "Chromium plating": Metal Ind., vol. 29, Nov. 12, 1926, p. 464. Krause, E., "Chromium plating in factory practice": Metal Ind., vol. 29, Dec. 3, 1926, p. 534. Strausser, P. W. C., "Chromium plating process": Metal Ind., vol. 24, Apr. 5, 1924, pp. 372–374. Iron Age. "Plating with chrome for ware": Vol. 27, Sept. 7, 1925, p. 599.

Comparative Resistance of Mild Steel, Chromium Steel, and Chromium-Nickel Steel to Various Media

Reagent	Concentration, Conditions, Etc.	Carbon Steel	12 to 14% Chromium Steel	Chromium-Nickel Steel. Cr 18.0% Ni 8.0%
ACIDS:				
Acetic	100%	Attacked	Unaffected	Unaffected
	33%	Attacked	Attacked	Unaffected
	15%	Attacked	Attacked	Unaffected
	5%	Attacked	Attacked	Unaffected
Acetic vapor	100%	Attacked	Attacked	Attacked
	33%	Attacked	Attacked	Slight att'k
Benzoic	All concns. up to B. P. strength	Attacked	Unaffected	Unaffected
Boric	Saturated soln.	Attacked	Unaffected	Unaffected
	50% saturated	Attacked	Unaffected	Unaffected
	5% soln.	Attacked	Unaffected	Unaffected
	10% cold	Attacked	Unaffected	Unaffected
	10% hot	Attacked	Unaffected	Unaffected
Carbolic	All concns. up to B. P. strength	Attacked	Attacked	Unaffected
Chloracetic	Acid crystals	Attacked	Attacked	Attacked
	50% soln.	Attacked	Attacked	Attacked
Chlorosulphonic	Conc.	Attacked	Attacked	Unaffected
	10%	Attacked	Attacked	Slight att'k
	0.5%	Attacked	Attacked	Unaffected
Citric	All concns.	Attacked	Attacked	Unaffected
Chromic + 10% potassium ferricyanide	......	Attacked	Very slight staining	Unaffected
Formic	Conc.	Attacked	Attacked	Unaffected
	50%	Attacked	Attacked	Unaffected
	25%	Attacked	Attacked	Unaffected
	5%	Attacked	Attacked	Unaffected
	50% at boiling pt.	Attacked	Attacked	Attacked
Hydrocyanic	......	Attacked	Attacked	Unaffected
Hydrochloric	All concns., all temps.	Attacked	Attacked	Attacked
Hydrofluoric	......	Attacked	Attacked	Attacked
Lactic	B.P.	Attacked	Attacked	Unaffected
	50%	Attacked	Attacked	Attacked
	50% at 100°C.	Attacked	Attacked	Attacked
Malic	50% At 15°C.	Attacked	Attacked	Unaffected
	25% and	Attacked	Attacked	Unaffected
	10% 100°C.	Attacked	Attacked	Unaffected
	5%	Attacked	Attacked	Unaffected
Mixed acids ($HNO_3 + H_2SO_4$)	Nitrating mixtures	Attacked	Attacked	Practically unaffected
Nitric acid	Sp. gr. 1.42	Unaffected	Unaffected	Unaffected
	Sp. gr. 1.20	Attacked	Unaffected	Unaffected
	Under 11%	Attacked	Attacked	Unaffected
Nitrous	Sp. gr. 1.41	Attacked	Slight staining	Unaffected
	5%	Attacked		Unaffected
Oleic	......	......	Unaffected	Unaffected
Oxalic	1% at 15°C.	Attacked	Attacked	Unaffected
	5% and	Attacked	Attacked	Unaffected
	10% 50°C.	Attacked	Attacked	Unaffected
Phosphoric	100%	Attacked	Slight att'k	Unaffected
	75%	Attacked	Slight att'k	Unaffected
	50%	Attacked	Slight att'k	Unaffected
	25%	Attacked	Slight att'k	Unaffected
	5%	Attacked	Slight att'k	Unaffected
Picric	All concns. up to B. P. strength	Attacked	Unaffected	Unaffected
Pyrogallic	All concns. up to B. P. strength	Attacked	Unaffected	Unaffected
Stearic	......	Attacked	Unaffected	Unaffected
Sulphuric	All concns.	Attacked	Attacked	Attacked
Sulphurous	B.P.	Attacked	Attacked	Unaffected
Tannic	5%	Attacked	Unaffected	Unaffected
Tartaric	5% At 15°C.	Attacked	Attacked	Unaffected
	10% and	Attacked	Attacked	Unaffected
	25% 100°C.	Attacked	Attacked	Unaffected
	50%	Attacked	Attacked	Unaffected
Acetic anhydride	100%	Attacked	Attacked	Unaffected
Acetone	100%	Attacked	Slight	Unaffected
	50%	Attacked	Cor-	Unaffected
	5%	Attacked	rosion	Unaffected
Alum	Saturated soln.	Attacked	Attacked	Unaffected
	50% saturated	Attacked	Attacked	Unaffected
	5% soln.	Attacked	Attacked	Unaffected
	10%	Attacked	Attacked	Unaffected
Aluminum sulphate	10%	Attacked	Attacked	Unaffected
	5%	Attacked	Attacked	Unaffected
	1%	Attacked	Attacked	Unaffected
Ammonium bromide	5% 1% at 15°C. and 50°C.	Attacked	Attacked	Unaffected
Ammonium carbonate	Saturated	Unaffected	Unaffected	Uanffected
	10%	Unaffected	Unaffected	Unaffected
Ammonium chloride	20%	Attacked	Slight att'k	Unaffected
	10%	Attacked	Slight att'k	Unaffected
	5%	Attacked	Slight att'k	Unaffected
	1%	Attacked	Slight att'k	Unaffected
	47% boiling	Attacked	Attacked	Very slight
	23.5% boiling	Attacked	Attacked	attack
Ammonium hydroxide	All concns.	Unaffected	Unaffected	Unaffected
Ammonium nitrate	10%	Attacked	Unaffected	Unaffected
Ammonium sulphate	50%	Attacked	Attacked	Unaffected
	10%	Attacked	Attacked	Unaffected
	5%	Attacked	Attacked	Unaffected
Amm. sulph. + 5% H_2SO_4	At 50°C	Attacked	Attacked	Attacked
Beer	......	Attacked	Unaffected	Unaffected
Benzol	......	Unaffected	Unaffected	Unaffected
Bleaching powder	Aqueous susp'sion	Attacked	Attacked	Slight att'k
Bromine	100%	Attacked	Attacked	Attacked
Bromine water	3.3%	Attacked	Attacked	Attacked
	1.65%	Attacked	Attacked	Attacked
	0.83%	Attacked	Attacked	Attacked
	0.33%	Attacked	Attacked	Very slight
	0.165%	Attacked	Attacked	attack
	0.033%	Attacked	Attacked	Unaffected
Calcium chloride	Saturated	Attacked	Unaffected	Unaffected
	70%	Attacked	Unaffected	Unaffected
	50%	Attacked	Unaffected	Unaffected
	30%	Attacked	Slight att'k	Unaffected
	20%	Attacked	Slight att'k	Unaffected
	10%	Attacked	Slight att'k	Unaffected
Calcium hypochlorite	......	Attacked	Unaffected	Unaffected
Camphor	......	Unaffected	Unaffected	Unaffected
Carbon disulphide	......	Attacked	......	Unaffected
Carbon tetrachloride	As purchased	......	Unaffected	Unaffected
	50%	Attacked	Attacked	Attacked
	10%	Attacked	Attacked	Attacked
	1%	Attacked	Attacked	Attacked
Cider	......	Attacked	Unaffected	Unaffected
Chlorine gas	Wet and dry	Badly att'k	Badly att'k	Badly att'k
Copal varnish	......	Unaffected	Unaffected	Unaffected
Copper carbonate	Saturated in 50% ammonia	Attacked	Unaffected	Unaffected
Copper chloride	10%	Attacked	Attacked	Attacked
	5%	Attacked	Attacked	Attacked
Copper sulph. + 2% H_2SO_4	10%	Attacked	Unaffected	Unaffected
Ethyl alcohol	100%	Unaffected	Unaffected	Unaffected
Ethyl chloride	......	Attacked	Unaffected	Unaffected
Ethyl ether	100%	Unaffected	Unaffected	Unaffected
Ferric chloride	50%	Attacked	Attacked	Attacked
	10%	Attacked	Attacked	Attacked
	5%	Attacked	Attacked	Attacked
Ferric nitrate	5%	Attacked	Unaffected	Unaffected
Formaldehyde	40%	Attacked	Unaffected	Unaffected
Fruit juices	......	Attacked	Unaffected	Unaffected
Hydrogen peroxide	20 vols. at 15°C.	Attacked	Unaffected	Unaffected
	at 80°-100°-C.	Attacked	Attacked	Slight att'k
Inks	......	Attacked	Unaffected	Unaffected
Iodine	1%	Attacked	Attacked	Unaffected
	Saturated soln. + iodine crystals	Attacked	Attacked	Unaffected
Lime and limestone	Emulsion	Attacked	Unaffected	Unaffected
Lubricating oils	......	Unaffected	Unaffected	Unaffected
Magnesium carbonate	Paste	Slight att'k	Unaffected	Unaffected
Magnesium chloride	10%	Attacked	Attacked	Unaffected
Magnesium sulphate	10%	Attacked	Attacked	Unaffected
Mercurous nitrate	5%	Attacked	Unaffected	Unaffected
Mercuric chloride	5%	Attacked	Attacked	Unaffected
	2%	Attacked	Attacked	Unaffected
	0.5%	Attacked	Attacked	Unaffected
Mercuric cyanide	5%	Attacked	Attacked	Unaffected
Milk	Fresh	Attacked	Unaffected	Unaffected
	Sour	Attacked	Unaffected	Unaffected
Mine water	......	Attacked	Unaffected	Unaffected
Nickel nitrate	5%	Attacked	Unaffected	Uanffected
	10%	Attacked	Unaffected	Unaffected
Paraffin	......	Unaffected	Unaffected	Unaffected
Petrol	......	Unaffected	Unaffected	Unaffected
Photog'ic developers	......	Attacked	Unaffected	Unaffected
Potassium bromide	10% at 15°C.	Attacked	Attacked	Unaffected
	5% and	Attacked	Attacked	Unaffected
	1% 50°C.	Attacked	Attacked	Unaffected
Potassium cyanide	Saturated	Attacked	Unaffected	Unaffected
	50% saturated	Attacked	Unaffected	Unaffected
	5% saturated	Attacked	Unaffected	Unaffected
Potassium ferricyanide	Saturated	Attacked	Attacked	Unaffected
	50% saturated	Attacked	Attacked	Unaffected
	5% saturated	Attacked	Attacked	Unaffected
Potassium nitrate	10%	Attacked	Unaffected	Unaffected
Potassium oxalate	1%	Attacked	Unaffected	Unaffected
	0. 5%	Attacked	Unaffected	Unaffected
	0.25%	Attacked	Unaffected	Unaffected
Sea-water	At 15° C.	Attacked	Slight att'k	Unaffected
	At 80° C.	Attacked	Attacked	Unaffected
	in constant agitation	Attacked	Attacked	Unaffected
	Intermittent spray	Attacked	Attacked	Very slightly attacked
Silver nitrate	5%	Attacked	Unaffected	Unaffected
	1%	Attacked	Unaffected	Unaffected
Sodium bromide	10%	Attacked	Attacked	Unaffected
	5%	Attacked	Attacked	Unaffected
Sodium chloride	10%	Attacked	Slight att'k	Unaffected
	5%	Attacked	Slight att'k	Unaffected
	3%	Attacked	Slight att'k	Unaffected
Sodium citrate	3.5%	......	Unaffected	Unaffected
Sodium hydroxide	66%	Unaffected	Unaffected	Unaffected
	33%	Unaffected	Unaffected	Unaffected
Sodium hypochlorite	5%	Attacked	Unaffected	Unaffected
	0.2%	Attacked	Unaffected	Unaffected
Sodium nitrate	5%	Attacked	Unaffected	Unaffected
Sodium peroxide	At 80°-100°C.	Attacked	Attacked	Unaffected
Sodium salicylate	Saturated	Attacked	Unaffected	Unaffected
	50% saturated	Attacked	Unaffected	Unaffected
	5% saturated	Attacked	Unaffected	Unaffected
Sodium sulphate	Saturated	Attacked	Attacked	Unaffected
	10%	Attacked	Attacked	Unaffected
Sodium sulphide	10%	Attacked	Unaffected	Unaffected
Sodium thiosulphate + 4% potassium metabisulphite	30%	Attacked	Unaffected	Unaffected

Extracted from paper read by Dr. W. H. Hatfield at joint meeting of the Chemical Engineering Group, The British Chemical Plant Manufacturers' Association and the Institute of Metals, at the Congress of Chemists, London, July 20, 1926.

A partial list of the chief uses to which these alloys are put is as follows:

- Airplane parts.
- Air-compressor valves.
- Automobile parts and fittings.
- Bicycle parts.
- Bits and other parts of harness.
- Bolts, nuts, etc.
- Bottling machinery.
- Bread-making machinery.
- Buckles—shoe, harness, etc.
- Builders' tools.
- Butchers' rails, hooks, etc.
- Carburetor needles, jets, screws, etc.
- Cold-storage equipment.
- Cooking utensils.
- Cutlery.
- Dairy apparatus.
- Dies.
- Drawing instruments.
- Electrical appliances.
- Engine valves—aero, gas, oil, etc.
- Fishing tackle.
- Forks.
- Gauges.
- Golf club heads.
- Gun parts.
- House fittings.
- Instruments, musical.
- Keys.
- Knives.
- Laboratory fittings
- Locks.
- Machinery parts.
- Micrometer frames.
- Motion-picture machinery.
- Motor-cycle parts.
- Molds.
- Nozzles, etc.
- Ornamental metal work.
- Paper and pulp machinery parts.
- Periscope parts.
- Phonograph parts.
- Pump rods and parts.
- Railroad equipment.
- Refrigerator parts.
- Roller bearings.
- Saddlery hardware.
- Scale parts.
- Sewing machine parts.
- Soap-manufacturing machinery.
- Soda-fountain parts.
- Turbine blades.
- Washing-machine parts.
- Water-motor parts.
- Weighing-machine parts.
- Yacht fittings.

A metallurgical problem in the present method of utilizing chromium in steel making is indicated by the fact that it is thought necessary to manufacture ferrochrome in order to introduce the metal into the various alloys. In the manufacture of ferrochrome there is a decided loss of chromium. If the metal itself could be used and introduced into the ladle, this loss would be eliminated.

SUMMARY

In 1922 the world's production of chromite was 143,699 long tons, and imports into the United States were 90,081 tons; in 1923 the world's production was 201,040 long tons, and imports into the United States were 128,763 tons. In 1925 imports into the United States were 149,739 tons; thus the apparent consumption in the United States in 1925 was greater than the world's production of 1922. In 1926 the imports into the United States were 215,464 tons, indicating a domestic consumption in excess of the world's production of 201,040 long tons in 1923.

In 1913 the Engineering and Mining Journal quotation for chromite at New York was $11.19; in 1922 it was $22.53; and since then, in spite of the rapid increase in demand, the world's price has remained relatively constant. A logical inference from the conditions outlined is that the supply is adequate to the demand. This inference is strengthened by the fact that, possibly because of political influence, the large reserves in northern Asia Minor have not been drawn upon in the past few years, and thus constitute a very valuable latent supply.

In 1913 the United States acquired in the form of crude ore some 65,000 long tons, England 25,000 tons, France 35,000 tons, Germany 30,000 tons, and other countries small amounts, making a total of approximately 155,000 tons. In 1926 the United States acquired in the form of crude ore 215,000 tons, a fact indicating that the United States alone consumed in this year 1.39 times the approximate total utilized in 1913 by the major consuming countries.

PLATINUM AND ALLIED METALS

By James M. Hill[1]

CRUDE PLATINUM

Mine returns for 1926 indicate a production of 10 troy ounces of crude platinum in Alaska, 269 ounces in California, and 7 ounces in Oregon, a total of 286 ounces for the United States. In 1925 Alaska produced 12 ounces, California 312 ounces, and Oregon 19 ounces.

Platinum refiners report purchases of domestic platinum in 1926, as follows: Alaska, 1 ounce; California, 110 ounces; Oregon, 60 ounces—a total of 171 ounces, or 80 ounces less than refiners purchased in 1925. Refiners also report purchases of 43,096 ounces of foreign crude platinum in 1926—4,242 ounces from Australia, 23 ounces from Canada, 37,564 ounces from Colombia, and 1,267 ounces from Russia. The total is 4,201 ounces less than the purchases reported in 1925. According to the Bureau of Foreign and Domestic Commerce the imports of platinum from Colombia during 1926 were 39,004 ounces, and the total imports of unmanufactured platinum were 114,968 ounces, an increase of 8 per cent, as compared with imports of crude in 1925.

REFINED PLATINUM METALS

NEW METALS

Reports of refiners of crude platinum, gold bullion, and copper indicate that 84,981 ounces of platinum metals were recovered in the United States from these sources in 1926, an increase of 35,338 ounces, or 71 per cent, as compared with recoveries in 1925. It is estimated that 11,165 ounces of the total quantity in 1926 were derived from domestic sources.

New platinum metals recovered by refiners in the United States, 1917–1926, in troy ounces

Year	Platinum	Palladium	Iridium	Osmiridium	Others	Total
1917	33,009	4,779	210	833	----------	38,831
1918	54,399	4,024	465	539	326	59,753
1919	40,220	3,807	401	402	279	45,109
1920	36,015	4,309	418	409	393	41,544
1921	51,791	2,686	286	581	1,026	56,370
1922	54,142	1,943	210	1,301	122	57,718
1923	46,780	1,934	280	787	16	49,797
1924	57,827	6,065	680	1,261	174	66,007
1925	41,300	7,358	283	648	54	49,643
1926	76,154	6,437	234	2,113	43	84,981

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[1] Helen M. Gaylord, of the Bureau of Mines, assisted in the preparation of this report. The figures on imports and exports were compiled from records of the Bureau of Foreign and Domestic Commerce by J. A. Dorsey, of the Bureau of Mines.

New platinum metals recovered by refiners in the United States, 1925–26, by sources, in troy ounces

	Platinum	Palladium	Iridium	Osmiridium	Others	Total
1925						
Domestic:						
Crude platinum	136	----------	36	39	3	214
Ore	----------	2,842	----------	----------	----------	2,842
Gold and copper refining	4,189	3,952	----------	12	----------	8,153
	4,325	6,794	36	51	3	11,209
Foreign:						
Crude platinum	36,740	259	237	597	51	37,884
Gold and copper refining	235	305	10	----------	----------	550
	36,975	564	247	597	51	38,434
Total recovery	41,300	7,358	283	648	54	49,643
1926						
Domestic:						
Crude platinum	96	1	23	13	7	140
Ore	----------	3,330	----------	----------	----------	3,330
Gold and copper refining	4,827	2,856	3	----------	9	7,695
	4,923	6,187	26	13	16	11,165
Foreign:						
Crude platinum	32,668	250	208	2,100	27	35,253
Gold and copper refining	38,563	----------	----------	----------	----------	38,563
	71,231	250	208	2,100	27	73,816
Total recovery	76,154	6,437	234	2,113	43	84,981

SECONDARY METALS

Secondary platinum metals are those recovered from the treatment of scrap metal, sweeps, and other waste products of manufacture that contain platinum. Although the figures in the following table undoubtedly contain some duplication, it is believed that they are worth publishing.

Secondary platinum metals recovered in the United States, 1917–1926, in troy ounces

Year	Platinum	Palladium	Iridium	Others	Total
1917	59,007	3,347	9,832	----------	72,186
1918	40,378	1,795	3,410	----------	45,583
1919	54,545	3,467	3,504	----------	61,516
1920	51,255	3,100	3,355	----------	57,710
1921	39,131	4,887	1,776	229	46,023
1922	40,062	4,193	1,937	496	46,688
1923	39,152	6,246	2,021	453	47,872
1924	45,474	5,784	2,200	1,013	54,471
1925	35,578	4,680	1,827	1,189	43,274
1926	38,795	5,647	1,478	217	46,137

IMPORTS AND EXPORTS

Platinum metals imported for consumption in the United States, 1917–1926

Year	Troy ounces	Value	Year	Troy ounces	Value
1917	35,773	$2,957,197	1922	110,025	$8,983,547
1918	56,756	5,167,908	1923	106,637	10,466,705
1919	68,054	6,747,447	1924	111,359	11,030,349
1920	100,546	10,617,440	1925	125,802	13,230,148
1921	78,378	5,418,464	1926	134,797	13,451,835

Platinum metals imported for consumption in the United States, 1925–26, by metals

Metal	1925			1926		
	Troy ounces	Value		Troy ounces	Value	
		Total	Average		Total	Average
Platinum:						
Ores of platinum metals (platinum content)	757	$71,386	$94.30	1,221	$124,668	$102.10
Grains, nuggets, sponge, or scrap	58,718	5,725,015	97.50	87,162	8,683,359	99.62
Ingots, bars, sheets or plates, not less than one-eighth inch thick	47,002	5,504,068	117.10	26,585	2,995,582	112.68
	106,477	11,300,469	106.13	114,968	11,803,609	102.67
Manufactures of, except jewelry	62	6,991	112.76	5	646	129.20
Iridium	2,349	586,913	249.86	3,305	411,646	124.55
Osmiridium	3,236	446,276	137.91	684	64,714	94.61
Osmium	1,050	120,845	115.09	5,457	594,042	108.86
Palladium	8,296	483,349	58.26	8,258	460,015	55.71
Rhodium	2,476	169,687	68.53	1,362	78,907	57.93
Ruthenium	1,856	115,618	62.29	758	38,256	50.47
	125,802	13,230,148	105.17	134,797	13,451,835	99.79

Platinum metals (unmanufactured) imported into the United States in 1926, by countries, in troy ounces

[General imports]

Country	Platinum (grains, scrap, ingot, etc.)	Palladium	Iridium	Osmium and osmiridium	Rhodium and ruthenium	Total
Australia	4			1,665		1,669
British South Africa				36		36
Canada	1,433	1,133	15	124	191	2,896
Chile	176					176
China	12			19		31
Colombia	39,004	9	3	8		39,024
France	11,419	122	367	343	399	12,650
French Indo-China	106					106
Germany	2,347	549	346			3,242
Latvia	1,976					1,976
Mexico	895					895
Nicaragua	8					8
Panama	2,167					2,167
Philippine Islands	4					4
United Kingdom	55,417	6,445	2,574	3,946	1,530	69,912
	114,968	8,258	3,305	6,141	2,120	134,792

Platinum exported from the United States, 1917–1926

Year	Unmanufactured		Manufactures of, except jewelry	
	Troy ounces	Value	Troy ounces	Value
1917	3,445	$234,433	(1)	$65,415
1918	119	13,511	(1)	23,562
1919	522	75,066	(1)	54,529
1920	1,302	177,115	(1)	111,014
1921	3,272	244,473	741	85,216
1922 Crude, scrap, and old	143	13,149	486	35,967
1922 Ingots, sheets, wire, and alloys	1,313	127,047		
1923	1,151	128,599	592	65,073
1924	5,854	643,282	1,274	136,948
1925	16,234	1,787,122	3,537	249,975
1926	11,573	1,253,795	1,898	160,648

[1] Quantity not recorded.

CONSUMPTION

According to reports from refiners, the consumption of platinum metals in the United States in 1926 was 171,616 ounces, a decrease of 3 per cent as compared with 1925. The chemical industry used 2,858 ounces less than in 1925, most of which was platinum. The electrical industry used 1,626 ounces less than in 1925, decreasing its consumption of platinum and increasing that of palladium and iridium. The dental industry consumed 4,604 ounces less, using less platinum and palladium but more iridium than in 1925. The jewelers decreased their consumption by 12,282 ounces, a decline in use of all the metals except iridium. The quantity of platinum metals consumed for miscellaneous uses was nearly four times as large as in 1925.

Platinum metals consumed in the United States as reported by refiners, 1925–26, by industries, in troy ounces

Industry	Platinum	Palladium	Iridium	Others	Total	Percentage of total
1925						
Chemical	12, 558	383	71	685	13, 697	8
Electrical	18, 845	3, 157	1, 579	111	23, 692	13
Dental	9, 293	14, 952	95		24, 340	14
Jewelry	93, 293	10, 950	2, 840	2, 280	109, 363	62
Miscellaneous	3, 356	520	220	1, 414	5, 510	3
	137, 345	29, 962	4, 805	4, 490	176, 602	100
1926						
Chemical	10, 253	213	145	228	10, 839	6
Electrical	16, 765	3, 508	1, 608	185	22, 066	13
Dental	8, 542	11, 063	131		19, 736	11
Jewelry	85, 908	7, 770	2, 949	454	97, 081	57
Miscellaneous	17, 381	2, 181	581	1, 751	21, 894	13
	138, 849	24, 735	5, 414	2, 618	171, 616	100

STOCKS

Stocks of the platinum metals in the hands of refiners on December 31, 1926, amounted to 105,571 ounces, an increase of 33 per cent as compared with the stocks at the beginning of the year.

Stocks of platinum metals in the hands of refiners in the United States, December 31, 1918–1926, in troy ounces [1]

Year	Platinum	Palladium	Iridium	Others	Total
1918	51, 504	10, 086	3, 224		64, 814
1919	29, 228	10, 235	3, 359	610	43, 432
1920	46, 747	16, 565	4, 196	216	67, 724
1921	38, 514	21, 042	4, 991	3, 113	67, 660
1922	41, 900	24, 975	7, 559	1, 583	76, 017
1923	36, 554	26, 266	5, 208	2, 697	70, 725
1924	40, 464	27, 400	3, 622	3, 053	74, 539
1925	44, 024	26, 740	3, 720	4, 609	79, 093
1926	64, 203	31, 950	3, 933	5, 485	105, 571

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[1] Figures not available prior to 1918.

MARKET AND PRICES

CRUDE PLATINUM

Sellers of domestic crude platinum reported they were paid for metal content based on assay, and no figure can be given for crude platinum. Buyers reported purchases at $96 to $100 an ounce for domestic and $75 to $106 for foreign crude platinum. Buyers of foreign and domestic crude platinum in the United States who reported purchases in 1926 are as follows:

American Platinum Works, 325 New Jersey Railroad Avenue, Newark, N. J.
Baker & Co. (Inc.), Murray and Austin Streets, Newark, N. J.
Sigmund Cohn, 44 Gold Street, New York, N. Y.
Goldsmith Bros. Smelting & Refining Co., 907 Hayworth Building, Chicago, Ill.
S. B. Gracier & Sons, 608 Commercial Street, San Francisco, Calif.
Kastenhuber & Lehrfeld, 24 John Street, New York, N. Y.
Pacific Platinum Works (Inc.), 814 South Spring Street, Los Angeles, Calif.
R. & H. Platinum Works (Inc.), 709 Sixth Avenue, New York, N. Y.
Shreve & Co., Post Street and Grant Avenue, San Francisco, Calif.
L. E. Waterman Co., New York, N. Y.
Wildberg Bros., 742 Market Street, San Francisco, Calif.
H. A. Wilson Co., 97 Chestnut Street, Newark, N. J.

REFINED METALS

Quotations [2] on platinum at the first of the year were $120 an ounce, but the price began to sag at the end of January and at the end of February was $112, a price that was maintained until the second week of May, when it reached $110; it again dropped, reaching $108 the third week of May. The middle of June prices began to recover, rising to $110, and by the 1st of July to $114. The price was $116 the 1st of August and $118 at mid-September, but in the middle of October it sagged to $112, a figure that was maintained to the end of the year. Refiners report the high price for platinum at $120, the low, $101, and the average for the year as $111 an ounce.

Palladium quotations followed much the same course, opening the year at $78 to $82 an ounce, reaching a low of $66 to $70 in mid-September, rising to $68 to $72 during December, and closing the year at $63 to $66 an ounce. Refiners report a high of $83, low of $63, and average price for the year of $70 an ounce.

Iridium was quoted at $380 to $390 an ounce the first of the year and at $300 to $325 the end of February. With the arrival of large supplies from Australia and South Africa (via England) the price began to sag, reaching $200 to $215 the 1st of May and $125 to $135 the 1st of July, a price that was maintained until the end of October, when the low of $120 to $125 an ounce was reached and was maintained to the end of the year. Refiners give the following prices: High, $390; low, $115; and average for the year, $169 an ounce.

The average selling price of osmium was $78, of rhodium $77, of ruthenium $69, of the 5 per cent platinum-iridium alloy $116, and of the 10 per cent alloy $123 an ounce.

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[2] Engineering and Mining Journal: Vols. 121 and 122, 1926.

There has been considerable publicity about the suitability of palladium, platinum, and ruthenium alloys for the manufacture of jewelry. One article in The Jewelers' Circular of January 2, 1927, pages 241–242, is especially interesting because it gives much information on palladium and its possibilities that is not generally known. Baker & Co., by an inquiry among the members of the jewelry trade, evolved some interesting facts on the use of alloys by jewelers, and the annual review number of The Jewelers' Circular, published September 29, 1926, carried a number of full-page advertisements of various makers of palladium alloys which give additional information.

WORLD'S PRODUCTION

Estimated world's production of crude platinum from placers, 1917–1925, in troy ounces

Country	1917	1918	1919	1920	1921	1922	1923	1924	1925
Australasia:									
New South Wales	259	607	213	796	249	80	586	646	573
Papua (osmiridium) [1]	(2)	(2)	(2)	100	360	100	[3] 145	[3] 119	[3] 116
Tasmania (osmiridium)	332	1, 607	1, 670	2, 009	1, 751	1, 174	673	365	3, 366
Canada [4]	80	40	30	25	15	15	10	5	6
Colombia [5]	32, 000	35, 000	35, 000	35, 000	35, 500	40, 000	42, 000	46, 000	62, 000
India (British)	4	(6)	--------	--------	--------	--------	--------	--------	--------
Japan	127	51	155	258	231	150	224	145	189
Philippine Islands	--------	--------	--------	--------	--------	1	14	--------	4
Russia [5]	50, 000	25, 000	30, 000	35, 000	20, 000	22, 000	20, 000	25, 000	60, 000
United States	605	647	824	613	977	1, 008	609	335	343

[1] For year ended June 30 of year stated.
[2] Figures not available, but annual output did not exceed 10 ounces.
[3] Exports.
[4] Estimated by J. M. Hill. The Dominion Bureau of Statistics Ann. Repts. give the placer output of Canada, in troy ounces, as follows: 1917, 57; 1918, 39; 1919, 25; 1920, 17; 1921, 23; 1922, 12; 1923, 7; 1924, 5; 1925, 6.
[5] Estimated by J. M. Hill.
[6] Production, 0.31 ounce.

The following table gives data by which the figures showing the production of crude platinum as given in the foregoing table can be reduced to terms of the refined metals used by the industries:

Average assay of crude platinum, in per cent

Country	Platinum	Palladium	Iridium	Osmium	Rhodium, ruthenium, etc.
Australasia:					
New South Wales	75. 9	--------	1. 3	--------	1. 3
Papua	--------	--------	58. 1	33. 5	3. 0
Tasmania	--------	--------	58. 1	33. 5	3. 0
Canada	72. 1	0. 2	1. 1	--------	2. 8
Colombia	96. 2	. 5	1. 1	--------	1. 4
Japan	. 2	--------	49. 8	37. 3	3. 9
Russia	83. 5	1. 9	1. 9	3. 0	. 6
United States	85. 5	. 6	1. 1	1. 3	1. 0

INTERNATIONAL CONTROL

There has been considerable discussion concerning future trends of the platinum market and prices in the technical press, chiefly in the South African mining journal. Naturally the future must be forecast with all possible intelligence if the important platinum deposits of South Africa are to become dividend payers.

Kovaloff[3] has written a number of thought-stimulating articles that treat the important subject of possible future overproduction due to the reopening of the Russian mines and the new production in South Africa. His estimates of possible future trends of consumption are based on United States Bureau of Mines figures and his assumption that the United States consumption equals two-thirds of the world consumption. That everyone does not agree with his conclusion that there must be world control of this commodity, based on international control and government purchases to maintain price, is indicated by Richards,[4] who believes that cooperation in marketing by the South African producers seems obvious. Richards does not believe that an international agreement is possible or that government purchases of a guaranteed quantity each year at a fixed price are economically feasible. Nevertheless, it is evident that an attempt is being made to form an international cartel, for Charles Engelhard, of New York, was in Europe the greater part of 1926 on such an errand.[5]

LEGISLATION

The platinum stamping law, noted in the 1925 Mineral Resources report on Platinum and Allied Metals, pages 58 to 61, was finally adopted by the various contending factions of the industry with a few minor modifications. The provisions of this measure were adopted by the New York State Legislature and signed by Governor Smith, March 22, 1927. An exactly similar act was introduced before the New Jersey Legislature, but up to April 24, 1927, no published report as to its status had been noted by the writer. The national stamping law was presented to the Sixty-ninth Congress of the United States just before its termination on March 4, 1927, and will be reintroduced in the Seventieth Congress when it meets next December.

The courts upheld the New York State platinum law in a test case raised in the Abram and Max Suderov matter. The Supreme Court finally ruled that to mark a piece of jewelry "Plat. Top—18K," when in reality it is a white gold article with a thin top of platinum, is a violation of the marking law.

At the international congress of manufacturers and dealers in jewelry and silverware, held in Amsterdam, April 23, 1926, one of the resolutions passed states "It is recommended that the same standard shall apply to white gold as in yellow gold"; that is, the resolution recommends the adoption of the same standards by all countries. Another resolution concerning platinum stated "It is desirable that all countries shall consider the advisability of adopting a uniform standard." A third related to "Misleading and fraudulent use of the denominations platinum, gold, and silver."

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[3] Kovaloff, Paul, "Platinum and the platinoid metals": South African Min. and Eng. Jour., vol. 36, Jan. and Feb., 1926, pp. 519–520, 537–538, 561–562, 585–587, 609–610; "The economic history of platinum": South African Min. and Eng. Jour., vol. 37, Apr., 1926, pp. 113–115, 137–139; "The platinum market in the near future": South African Min. and Eng. Jour., vol. 37, July, Aug., and Oct., 1926, pp. 137–140, 615–619, 641–645; "Platinoids": South African Min. and Eng. Jour., vol. 37, Oct. and Nov., 1926, pp. 169–170, 223–224, 309–310, 337–338.

[4] Richards, C. S., "The platinum position in South Africa": South African Min. and Eng. Jour., vol. 37, Sept., 1926, pp. 17, 26–27.

[5] Mining Journal (London), "The platinum market": Vol. 155, Oct. 9, 1926, pp. 813–814.

METALLURGY

Several patents were granted for various platinum and palladium-ruthenium alloys, and an article by Hoke[6] gives some data concerning various white alloys used as substitute for platinum. An article in Metal Industry, volume 24, pages 230–231, describes the Raritan electrolytic refinery of the Anaconda Copper Mining Co., which recovers the small quantities of platinum and palladium normally found in all copper ores.

NOTES ON PLATINUM DEPOSITS

UNITED STATES

The Salt Chuck mine in southeast Alaska was operated most of the year and for a while was milling 350 tons of palladium-bearing copper ore a day; the copper-palladium concentrates were shipped to Irvington, N. J. In November it was reported[7] that the mine had been closed because of the fall in the price of palladium.

In California mining companies reported the production of 269 ounces of crude platinum, 89 per cent of which was produced by 12 dredges in Yuba and Sacramento Counties. Most of the remainder came from dredges at the base of the Sierras and only a few ounces was won by snipers in Trinity County.

In Oregon the 7 ounces of crude platinum (reported by refiners) came almost entirely from beach deposits in Coos and Curry Counties. Three rather large plants for treating black sands were installed during 1926 but did not get on a producing basis.

No work was done at the Boss mine, Clark County, Nev., though it was rumored late in the year that the mine might be reopened.

Promoters of the Ruby Beach Mining Co., who claimed to have beach deposits carrying platinum in the State of Washington, were sentenced January 10, 1927, for using the mails to defraud.

The sale of the Rambler mine, Albany County, Wyo., to the Electrolytic Copper Co. on a tax deed was declared to be illegal by the Wyoming Supreme Court.[8] The mine was not in operation in 1926.

AUSTRALASIA

Production of platinum metals in 1925 was 573 ounces of platinum from New South Wales, 3,366 ounces of osmiridium from Tasmania, mostly from the new Adams River field, and 116 ounces of osmiridium reported exported from Papua. Stephens[9] describes the occurrence of osmiridium in serpentine on Bold Hill, 20 miles from Mount Bischoff, Tasmania, and the method of mining and milling. The metal recovered carries almost no osmiridium.

McIntosh Reid, in the February issue of the Mining Magazine, describes the Adams River osmiridium field, and in October, 1926, it was announced that a producers' pool had been formed to market the entire output of osmiridium through Robert Nettleford, Pty., Ltd.[10]

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[6] Hoke, Calm Morrison, "What you ought to know about white gold": The Jewelers' Circular, May 12, 1926, pp. 63–65.

[7] Mining Truth, Nov. 16, 1926, p. 28.

[8] Engineering and Mining Journal-Press, "Rambler mines were in tax-sale suit": Vol. 121, Feb. 27, 1926, p. 378.

[9] Stephens, F. B., "Osmiridium in situ": Chem. Eng. and Min. Rev. (London), Sept., 1926. Reviewed Min. Mag. (London), Dec., 1926, pp. 378–379.

CANADA

Production of placer platinum in Canada in 1925 was officially reported[11] at 6 ounces and in 1926 at 50 ounces, and the recovery from refining nickel matte was given as 8,692 ounces of platinum and 8,288 ounces of palladium, rhodium, iridium, etc., in 1925 and at 9,471 and 10,024 ounces, respectively, in 1926.

There was considerable activity on the Tulameen River in 1926, and it was reported that a prospector named Garnet Soolheran mined 18 ounces of platinum from a placer claim near Boalmont, British Columbia. Platinum was also reported from the gravels of the Slave River near Caribou Island and extending to Fort Chippewayan.[12]

COLOMBIA

The South American Gold & Platinum Co. seems to have emerged from its legal difficulties in excellent condition. After March, 1926, all three dredges were at work and the hydroelectric power plant was able to furnish all necessary power. The No. 1 boat will be converted to electric drive very shortly. The production of this company has been increasing steadily. The output from January to September, 1926, was 14,310 ounces; monthly operating costs on the No. 3 boat were 8.6 cents a yard and on the No. 2 boat 14 cents a yard.[13]

Cranston [14] gives some details concerning the operation of the South American Gold & Platinum Co.

The British Platinum & Gold Corporation (Ltd.) [15] operated its No. 1 dredge on the Opogodo steadily from August, 1925, to June, 1926, and recovered 2,902 ounces of platinum. The El Salto property was not worked because of legal difficulties. No. 2 dredge was placed on the Cascajero property, was remodeled by putting in a tailings stacker, and dug 77,970 yards, which yielded 445 ounces of platinum. This made a total of 1,082 ounces recovered up to the end of June, 1926. Early in July No. 2 boat capsized during a flood and was not in commission thereafter.

The Colombian Government was considering increasing the export tax on platinum from 5 to 10 per cent ad valorem,[16] but no information is in the hands of the writer on April 24, 1927, to indicate what action was taken on this proposal.

RUSSIA

Production of platinum in Russia continued to increase and is estimated to be not far from 93,000 ounces for 1926. The official Soviet figures for the last few years are [17]: 1922, 22,500 ounces; 1923,

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[10] Mining Magazine (London), vol. 35, Oct., 1926, p. 227.

[11] Preliminary Report on the Mineral Production of Canada, Dominion Bur. Statistics, Ottawa, 1927.

[12] Engineering and Mining Journal-Press, "Platinum reported in Northwest Territory, Canada": Vol. 121, Mar. 6, 1926, p. 415.

[13] Engineering and Mining Journal, "Consolidated Gold Fields expands American activities": Vol. 123, Jan. 1, 1927, p. 36.

[14] Cranston, Robert E., "Colombian platinum placers have up-to-date equipment": Eng. and Min. Jour., vol. 122, Aug. 28, 1926, p. 339.

[15] Rept. Annual Meeting, Min. Mag. (London), vol. 34, Jan., 1926, p. 42.

[16] Boaz, William, "Proposed modification of export duties": Com. Repts., No. 36, Sept. 6, 1926, p. 627.

[17] Mining Journal (London), June 26, 1926, p. 534.

30,000 ounces; 1924, 40,000 ounces. The "Uralplatina," the Soviet controlling body for the platinum industry, early in the year [18] announced that thereafter sales of Russian platinum in refined form would be conducted only through Edelmetalle-Vertriebs A. G. [Precious Metals Trading Co. (Ltd.) of Berlin].

Lipovsky,[19] in an interview given while on a visit to South Africa, gave out the information that a body of dunite, carrying chromite and assaying up to 3 ounces of platinum a ton but averaging 1 to 2 dwt. a ton, was then being quarried and concentrated at a cost of about 1 shilling a ton.

UNION OF SOUTH AFRICA

The daily press and technical papers of England and South Africa have given much notice to the remarkably large and widespread occurrences of platinum ores in the Bushveld series of rocks in the Transvaal. Miles of reef seem to be platiniferous to some extent and in several places to carry ore of workable grade. The most accurate descriptions of the geology of these deposits are to be found in the published works of Wagner.[20]

The Merensky reef of the Rustenburg and other districts has been described in the American journals by various writers.[21]

The Bureau of Foreign and Domestic Commerce, in Foreign Trade Notes 101, August 2, 1926, has given some of the economic data with regard to companies and production.

Editorials in the South African Mining and Engineering Journal of July 24 and 31, 1926, summarize the situation fairly well; there are undoubtedly large and valuable platinum-metal deposits, but the mining and especially the metallurgical problems are difficult and have not been satisfactorily solved as yet. There is much question whether the world markets could absorb as much of the platinum metals as could be produced if all possible mines in the Transvaal were operating. As a matter of fact, only four mines are producing—the Onverwacht, the Lydenburg Platinum Areas, the Transvaal Platinum, and the Potgietersrust. The Potgietersrust is probably in the strongest financial hands, Johannesburg Consolidated Investment Co., and has a good chance of ultimate success. The Transvaal Platinum (Ltd.) produced for a while, but in October, 1926, began to falter, and on April 29, 1927, a meeting was held to liquidate the company voluntarily.[22]

The total sales [23] of platinum metals in South Africa in 1926 were: Platinum, 4,951.347 ounces, valued at £93,307, and osmiridium, 5,925.291 ounces, valued at £91,330.

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[18] Mining Journal (London), Feb. 27, 1926, p. 176.

[19] South African Mining and Engineering Journal, "A talk on platinum": Vol. 37, Oct. 9, 1926, p. 155.

[20] Wagner, Percy A., "Notes on the platinum deposits of the Bushveld igneous complex": Paper before Geol. Soc. of South Africa; reviewed South African Min. and Eng. Jour., vol. 36, Jan. 30, 1926, pp. 601-603. "The Rustenburg platinum deposits": Rept. Geol. Survey Dept. of the Union; reviewed South African Min. and Eng. Jour., vol. 37, May 8, 1926, pp. 247-248.

[21] Newberry, A. W., and Kemp, J. F., "Platinum in the Transvaal and elsewhere": Eng. and Min. Jour.-Press, vol. 121, 1926, pp. 717-725, 763-768; "Platinum in the Rustenburg district, Transvaal": Eng. and Min. Jour., vol. 123, Jan. 8, 1927, pp. 58-59. Spurr, J. E., "Review of occurrence of platinum metals in South Africa": Eng. and Min. Jour.-Press, vol. 121, June 5, 1926, pp. 943-944.

[22] The Jewelers' Circular, April 13, 1927, p. 57.

[23] South African Mining and Engineering Journal, vol. 37, Feb. 5, 1927, p. 620.

ARSENIC

By V. C. Heikes [a]

PRODUCTION AND SALES

Producers of refined and crude white arsenic (arsenious oxide) in the United States in 1926 reported an output of 6,759 short tons, of which 5,895 tons was refined (99 per cent pure) and 864 tons was crude. Most of this output was a by-product of the lead and copper smelters, but it included also the output of the Jardine Mining Co. The smelting plants producing refined white arsenic, crude white arsenic, and flue dust for the market were those of the American Smelting & Refining Co., at Tacoma, Wash., and Murray, Utah; that of the United States Smelting, Refining & Mining Co., at Midvale, Utah; and those of the Anaconda Copper Mining Co., at Anaconda, Mont., and Tooele, Utah.

No production of red arsenic sulphide or elemental arsenic was reported.

The total sales of refined and crude arsenic by producers in 1926 amounted to 11,805 short tons, valued at $674,350, or 2.856 cents a pound. These sales include 5,046 tons withdrawn from stock. The refined arsenic, 10,977 tons, was sold for $627,708, or 2.859 cents a pound; the crude arsenic, 828 tons, was sold for $46,642, or 2.817 cents a pound. The next table shows the white arsenic from all sources sold by producers in the United States in the last 10 years.

Crude and refined white arsenic sold by producers in the United States, 1917–1926

Year	Short tons		Value		Year	Short tons		Value	
	Refined	Crude	Total	Average (cents per pound)		Refined	Crude	Total	Average (cents per pound)
1917	6,151		$1,118,313	9.1	1922	8,905	1,122	$1,475,229	7.4
1918	[1]6,323		1,213,000	9.6	1923	12,357	1,914	2,808,801	9.8
1919	[1]6,029		1,181,684	9.8	1924	12,270	2,183	2,655,015	9.2
1920	10,942	560	2,021,356	8.8	1925	11,240	1,077	1,199,247	4.9
1921	3,427	1,359	717,700	7.5	1926	10,977	828	674,350	2.9

[1] Part of the output in 1918 and 1919 was elemental arsenic, but the elemental arsenic produced in 1920 and 1921 is not included in the table, as it was reduced from white arsenic purchased on the market. No elemental arsenic was produced from 1922 to 1926.

[a] Figures on imports compiled by J. A. Dorsey, of the Bureau of Mines, from records of the Bureau of Foreign and Domestic Commerce.

IMPORTS

Imports of white arsenic decreased from 9,316 short tons in 1925 to 7,703 tons in 1926. Most of the white arsenic, or 5,353 tons, was imported from Mexico. Imports of white arsenic into the United States from Canada were 1,504 tons and from Japan 357 tons. The other imports were from Belgium, Germany, France, Greece, and British India.

Arsenic compounds imported for consumption in the United States, 1917–1926

Year	Arsenic or arsenious acid (white arsenic, As_2O_3)		Arsenic sulphide (realgar and orpiment)		Sheep dip		Paris green and London purple	
	Short tons	Value	Short tons	Value	Pounds	Value	Pounds	Value
1917	1,178	$264,534	2,777	$410,341	(1)	$15,848	48	$189
1918	1,847	441,212	4,842	840,600	(1)	23,538	----------	----------
1919	4,389	624,494	2,151	316,687	146,803	12,346	18	14
1920	3,740	532,635	4,080	684,016	70,168	5,150	772	277
1921	1,669	253,250	3,343	531,322	61,377	6,362	325	123
1922 [2]	1,081	162,494	3,815	472,044	70,390	4,877	3,866	741
1923 [3]	10,152	1,985,400	1,097	268,311	87,739	5,237	100,781	20,586
1924 [4]	8,877	1,597,433	234	45,246	114,801	10,764	76,241	15,683
1925 [5]	9,316	1,076,073	476	63,296	73,477	4,953	2,880	702
1926 [6]	7,703	510,227	283	40,718	119,947	14,070	4,747	1,011

[1] Figures not available.

[2] Also 41,296 pounds of "acid," valued at $4,195, and 22,487 pounds of "metallic arsenic," valued at $3,484, imported Sept. 22 to Dec. 31, 1922. Not separately classified prior to change in tariff.

[3] Also 166,354 pounds of "acid," valued at $15,597; 174,415 pounds of "metallic arsenic," $37,314; and 26 pounds of "lead arsenate," $9.

[4] Also 420 pounds of "acid," valued at $121; 122,467 pounds of "metallic arsenic," $23,684; 3,585 pounds of "lead arsenate," $525; and 3,172 pounds of "calcium arsenate," $278.

[5] Also 59,112 pounds of "acid," valued at $2,676; 149,018 pounds of "metallic arsenic," $31,918; 10,467 pounds of "lead arsenate," $1,514; and 1,074 pounds of "calcium arsenate," $135.

[6] Also 2,340 pounds of "acid," valued at $165; 174,490 pounds of "metallic arsenic," $35,745; and 1,057 pounds of "calcium arsenate," $284.

White arsenic imported into the United States in 1926, by countries and districts

[General imports]

Country	Short tons	Value		District	Short tons	Value
		Total	Average (cents per pound)			
Belgium	339	$22,846	3.4	Buffalo	675	$43,866
Canada	1,504	98,399	3.3	El Paso	554	51,909
France	56	1,728	1.5	Los Angeles	50	2,876
Germany	70	9,686	6.9	Maryland	194	11,529
Greece	23	1,994	4.3	Michigan	673	42,166
India, British	[1] 1	218	19.5	New York	4,083	268,045
Japan (Chosen)	357	16,388	2.3	Ohio	100	8,418
Mexico	5,353	358,968	3.4	Philadelphia	38	5,281
				Rochester	15	971
				San Antonio	1,100	63,983
				San Francisco	196	9,420
				Vermont	25	1,763
	7,703	510,227	3.3		7,703	510,227

[1] 1,120 pounds.

ARSENIC MARKET IN 1926

DEMAND AND SUPPLY

About 75 per cent of the white arsenic sold by producers in the United States in 1926, according to the reports of these producers, was used for insecticides, largely in the form of either lead arsenate, calcium arsenate, or Paris green. The glass manufacturers utilized 15 per cent of the white arsenic sold and the makers of "weed-killer" solution (sodium arsenite) consumed about 8 per cent of the output. The use of the lower grade arsenical material as a preservative for timber in mines and for the buried portion of telegraph poles and fence posts is increasing. Complete statistics on production of these various materials are not available. For the year ended June 30, 1926, the consumption of refined white arsenic in the manufacture of insecticides, reported to the Bureau of the Census by 28 of the consuming plants, was 1,056 short tons for calcium arsenate, 2,692 tons for lead arsenate, and 1,128 tons for Paris green. The stock of white arsenic in the hands of these insecticide manufacturers on June 30, 1926, was 1,660 short tons. The companies reporting in 1926 represented approximately two-thirds of the industry, which would indicate a total consumption of white arsenic for insecticides of about 7,300 short tons.

According to the American Bureau of Metal Statistics, total deliveries of white arsenic for the year ended June 30, 1926, were 9,365 tons of refined white arsenic delivered by refiners and 7,222 tons of imported arsenic—a total of 16,587 tons.

Six arsenic plants, belonging to three smelting companies and one mining company, produced white arsenic in the United States during 1926. These plants all produced arsenic as a by-product. In 1926 the Anaconda Copper Mining Co. was the chief producer of white arsenic. The company's output came from its copper-ore reduction works at Anaconda, Mont., and some crude material was produced at its International smelter, a lead and copper plant in Utah. For several years the Anaconda Copper Mining Co. has conducted extensive experiments in treating poles and posts with arsenical dust for protection against decay, and considerable arsenical dust from the "cold treaters" has been sold for that purpose to telephone, telegraph, and power companies in different parts of the United States. Mine timbers for use underground at Butte, Mont., have been treated in an arsenic impregnation plant. Patent applications are pending on these methods of timber preservation, which have been in use for several years by some of the leading power companies.

Crude arsenic produced at the Murray lead plant of the American Smelting & Refining Co., in Utah, was shipped chiefly to plants making weed killer. The Tacoma plant of the American Smelting & Refining Co., in Washington, and the Globe arsenic refinery of the same company near Denver, Colo., produce refined white arsenic. The latter was not operated in 1926, but arsenic from stock on hand was marketed.

About two-thirds of the white arsenic recovered at the Midvale plant of the United States Smelting, Refining & Mining Co. in Utah was sold to manufacturers of insecticides and glass. The company used both the crude and refined arsenic in the manufacture of weed killer, the sales of which were large in 1926.

The low price of arsenic caused the Jardine Mining Co., at Jardine, Mont., to close its plant in May, and its high-grade arsenic in stock was sold to consumers.

Imports of white arsenic during 1926 amounted to 7,703 short tons. This quantity added to that produced (6,759 tons) in the United States in 1926 indicates a new supply of 14,462 tons.

According to the American Bureau of Metal Statistics, there remained 4,419 short tons of white arsenic in stock at the end of 1926, compared with 9,774 tons in 1925. Thus the total indicated supply of arsenic for the year of 1926, new supply plus stocks at the beginning of the year, was 24,236 tons.

PRICES

During 1924 and 1925 prices of white arsenic gradually declined, but in 1926 the economic bottom seems to have been reached and the price has been stable. The quoted price for white arsenic in New York, for arsenic delivered at consuming point, was 3.05 cents a pound in January; it increased to 3.41 cents in April, and was thereafter steady at 3.5 cents to the end of the year.

WORLD'S PRODUCTION

The principal countries producing arsenic ores and white arsenic are shown in the accompanying table, but most of the figures for 1926 are not available. The total output of white arsenic in Mexico in 1926 was 7,119 short tons (6,458,224 kilos), according to Acting Commercial Attaché George Wythe, Mexico City.[b]

World's production of arsenic ore and white arsenic, 1921–1925, in metric tons

[Compiled by L. M. Jones, of the Bureau of Mines]

Country and product	1921	1922	1923	1924	1925
Algeria:					
Arsenate of lead—					
Gross weight	----------	160	2,270	9,335	6,750
Arsenic content	----------	34	409	1,587	1,215
Australia:					
New South Wales—					
Ore and concentrates	1,117	(1)	11,677	4,487	3,400
White arsenic	403	296	367	328	301
Queensland—					
Ore	(1)	(1)	(1)	(1)	1,133
White arsenic	224	406	620	573	----------
South Australia—					
Ore—					
Gross weight	----------	----------	----------	69	102
Arsenic content	----------	----------	----------	(1)	(1)
Victoria—					
White arsenic	(1)	(1)	1,036	437	(1)
Western Australia—					
Ore [2]—					
Gross weight	7	1,092	----------	----------	----------
Arsenic content	(1)	(1)	----------	----------	----------
Austria:					
Ore [3]—					
Gross weight	----------	----------	----------	560	89
Arsenic content	----------	----------	----------	40	15
Arsenic content of gold ores	38	103	136	216	237

[1] Data not available.
[2] Exports.
[3] Exclusive of arsenical gold ores worked primarily for their gold and silver content.

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[b] Commerce Reports, May 16, 1927, p. 412.

World's production of arsenic ore and white arsenic, 1921–1925, in metric tons—Continued

Country and product	1921	1922	1923	1924	1925
Belgium:					
White arsenic	(4)	1,008	1,380	1,850	(1)
Brazil:					
White arsenic	127	154	162	146	(1)
Canada:					
White arsenic	1,353	1,867	2,340	1,631	910
Arsenic content of ores and concentrates [2]	(1)	470	572	465	648
China:					
Ore [2]	258	549	413	472	395
White arsenic [2]	100	30	176	237	94
Chosen:					
Ore	(1)	56	26	----------	(1)
White arsenic	(1)	(1)	95	----------	[2] 107
Czechoslovakia:					
Ore—					
Gross weight	(1)	(1)	24	217	(1)
Arsenic content	(1)	(1)	(1)	(1)	(1)
France:					
Ore	5,087	4,465	10,022	14,029	28,990
White arsenic	216	266	815	802	(1)
Germany:					
Ore and concentrates [5]—					
Gross weight	7,033	8,750	10,273	10,818	(1)
Arsenic content	2,342	2,958	3,363	3,499	(1)
Greece:					
White arsenic	768	967	1,176	1,096	(1)
Italy:					
Ore—					
Gross weight	60	450	206	147	4
Arsenic content	23	81	46	33	1
Japan:					
Ore	1,506	2,295	[6] 4,245	7,416	(1)
White arsenic	1,395	1,922	4,287	3,703	3,485
Mexico:					
White arsenic	785	[7] 272	1,402	2,551	4,193
Norway:					
Ore—					
Gross weight	----------	----------	577	----------	----------
Arsenic content	----------	----------	149	----------	----------
Peru:					
Ore	(1)	(1)	232	----------	(1)
Arsenic	(1)	(1)	[8] 115	----------	[9] 119
Portugal:					
Ore	11	106	160	279	76
White arsenic	268	604	887	874	1,092
Rhodesia, Southern:					
Ore—					
Gross weight	327	451	774	533	170
Arsenic content	(1)	(1)	(1)	(1)	(1)
Sweden:					
Ore—					
Gross weight	----------	----------	----------	80	110
Arsenic content	----------	----------	----------	19	21
Switzerland:					
Ore—					
Gross weight	39	10	100	(1)	(1)
Arsenic content	(1)	(1)	(1)	(1)	(1)
Turkey:					
Ore—					
Gross weight	(1)	[10] 200	(1)	(1)	(1)
Arsenic content	(1)	(1)	(1)	(1)	(1)
Union of South Africa:					
White arsenic	2	3	5	96	31
United Kingdom:					
Ore	----------	360	741	304	(11)
White arsenic and arsenic soot	1,049	994	1,631	3,258	2,586
United States:					
White arsenic	4,342	9,096	12,946	13,111	11,174

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[1] Data not available.

[2] Exports.

[4] No production reported. Declared exports of arsenic from Belgium to the United States in 1921 were 485 tons. No statement was made as to how much of this, if any, was of Belgian origin.

[5] Data relate to concentrates produced and ore sold without concentration.

[6] Incomplete figures, output of principal mines only.

[7] Figures of Mexican Government. The Peñoles Co. reports 335 tons shipped.

[8] Content of ore.

[9] White arsenic exported by the Anglo-French Ticapampa Silver Mining Co. (Ltd.).

[10] Year ended Oct. 31.

[11] Production reported, but figures not available for publication.

SELENIUM AND TELLURIUM

By V. C. Heikes [1]

SELENIUM

Three companies reported an output of 260,005 pounds of selenium in 1926, compared to 207,209 pounds in 1925, 188,525 pounds in 1924, and 136,152 pounds in 1923. Through the courtesy of the producers the estimated selenium output for 1923, as published in Mineral Resources, has been revised, and the totals for subsequent years are published here.

For several years the American Smelting & Refining Co. has been the largest producer of selenium. The American Metal Co. (Ltd.) and the Anaconda Copper Mining Co. also produce considerable selenium, which is recovered from the anode slimes or muds formed in the electrolytic refining of copper. Only a small percentage of the total selenium present in the slime has been recovered, but the increased demand for the metal during the last year has probably stimulated better and more efficient methods of recovery. Nearly all of the blister copper sent to the electrolytic refineries contains some selenium, and year after year the content has remained fairly constant. Hess,[2] in Mineral Resources of the United States, has reviewed the occurrence of selenium in minerals, in blister copper, and in ores. His findings point to a possible future supply of selenium should the demand continue.

The annual sales of selenium in the form of small pigs, in sticks half an inch thick and about 4 inches long, and in fairly coarse powder are given in the table following:

Selenium sold by producers and in stock at producers' plants in the United States, 1921–1926

Year	Sales			Stock at end of year (pounds)
	Pounds	Value		
		Total	Average	
1921	55, 978	$89, 148	$1. 59	----------
1922	123, 565	177, 542	1. 44	----------
1923	127, 174	237, 196	1. 86	677
1924	153, 762	286, 066	1. 86	48, 419
1925	194, 007	330, 637	1. 70	61, 775
1926	252, 312	438, 132	1. 74	72, 374

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[1] Figures on imports compiled by J. A. Dorsey, of the Bureau of Mines, from records of the Bureau of Foreign and Domestic Commerce.

[2] Hess, F. L., Mineral Resources of the United States, 1914, pt. 1, pp. 969–974, 1916.

Selenium and selenium salts imported for consumption in the United States, 1921–1926

Year	Pounds	Value	Year	Pounds	Value
1921	1,106	$2,099	1924	300	$606
1922	1,652	2,530	1925	5,807	10,582
1923	940	1,653	1926	18,885	34,680

Quotations in New York for selenium delivered at consuming point throughout 1926 were $1.90 to $2 a pound.

The United States seems to be the largest producer of selenium; some comes from Mexico, and a certain amount is produced in Europe. Efforts were made by investigators during the past year to discover new sources of selenium, particularly because of the possibility of its use in toughening rubber and as a stench in nonodorous gases. Considerable selenium was used in 1926 as a flame-proofing material for insulated wire cable. Officers of the copper-refining companies give out the opinion that an additional quantity of 25 to 50 tons per annum could easily be added to the present output at a certain increase of price.

Selenium has a vulcanizing effect on rubber, but sulphur chloride, in the vapor state or in solution, is still commonly used for vulcanizing articles of lighter weight. In 1925[3] selenium was put into practical use by the Simplex Wire & Cable Co., which owns the patents for making a flame-proofing material containing 1 to 3 per cent of selenium in a rubber compound; the selenium increases the resistance to abrasion of the vulcanized material by 50 per cent. Cables thus flame-proofed are meeting with success and are sold in large quantities.

An interesting article[4] recently reviewed the results of the addition of selenium to different types of rubber compounds. The use of selenium rubber in automobile tires and conveyor belts is now being extensively tested. A handbook reviewing the achievements in engineering, issued by the Westinghouse Electric & Manufacturing Co., calls attention to selenium, which has long been the toy of experimenters, and announces its adaptation to practical use. There is now available a low-cost, long-lived, reliable selenium cell and relay which may be depended on to operate a street light, an electric sign, a show window, a signal light, or a contactor.

Apparatus has been developed to measure concentrations of mercury vapor through the reaction between active selenium sulphide and the vapor.[5] The poisonous effect of mercury vapor is well known, and this selenium indicator will assume considerable importance by reason of the increasing use of mercury in industry, as in the mercury boiler, heating operations, and various catalytic applications.

Selenium and possibly tellurium may be successfully used as a stench material for nonodorous gases. The Bureau of Mines worked on the problem during the past year.

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[3] Industrial and Engineering Chemistry, September, 1926, p. 903.

[4] Boggs, C. F., and Follansbee, E. M., "Selenium in rubber compounds": Trans. Inst. Rubber Ind., December, 1926.

[5] Industrial and Engineering Chemistry, vol. 19, April, 1927, pp. 518–521.

Selenium and tellurium compounds made by Norman M. Stove and B. S. Hopkins were recently reported [6] to have value as bactericides and fungicides to combat such tree diseases as pear blight, apple blotch, and chestnut blight, and also as herbicides against such weeds as dandelions, Canada thistle, burdock, plantain, and pigweed.

TELLURIUM

Most of the tellurium sold in 1926 has been used for experimental work, and no commercial use has yet been found. The largest producer was the Raritan Copper Works at Perth Amboy, N. J. The United States Lead Refinery at Grasselli, Ind., and the plant of the American Smelting & Refining Co., at Omaha, Nebr., also produced tellurium. The total output was 917 pounds. The sales amounted to 1,106 pounds, valued at $2,229, or an average of $2.02 a pound. At the end of 1926 the quantity of tellurium in stock at producers' plants was 1,119 pounds. The use of amorphous tellurium as a precipitant for gold from dilute solutions has been patented by Walter O. Snelling (U. S. Patent 1,617,353).

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[6] Industrial and Engineering Chemistry, vol. 19, April, 1927, pp. 510–512.

TIN

By J. W. Furness[1]

GENERAL STATEMENT

During 1926 the only tin produced in the United States was mined in Alaska. The United States Geological Survey reports that the Alaskan production for the year was 7.14 long tons of recoverable tin in concentrates, valued at $10,400, as compared with 12.3 tons in 1925. The imports of tin ore or concentrates contained 303 long tons of metallic tin, and the imports of tin in bars, pigs, etc., were 77,159 long tons as compared with 191 tons of tin in ore and 76,646 tons in bars, pigs, etc., in 1925. The value of the 1926 imports of tin in bars, pigs, etc., was $104,793,396, as compared with the 1925 value of $95,121,111. The average price in New York per long ton of Straits tin in bars and pigs in 1926 was approximately $166 a ton more than that of 1925.

In 1925 the recovery of reclaimed tin amounted to 27,634 long tons. This tonnage, added to imports and allowance made for exports, makes available for consumption 103,348 tons. In 1926, 29,821 long tons of reclaimed tin were recovered; the imports were 77,159 tons, and the exports of tin in bars, pigs, etc., 1,980 tons, making a total of 105,000 tons available for consumption in that year.

The world's production of tin in 1926 is estimated to have been 147,300 long tons, as compared with 146,100 tons in 1925. During the past few years the United States has acquired a constantly increasing percentage of the world's output. Consideration of this interesting fact leads to the possible inference that as the price of tin continues to rise the world's market becomes confined more and more to nations that use large amounts to satisfy what may be termed luxury demands. The price of tin now has little relation to the cost of production. Present prices might increase materially and not affect the production of tin to a proportionate extent; conversely, a very marked decrease in price would not necessarily decrease output. The world's production of crude tin reaches the market as bars and pig tin through only a few channels. For example, all of the tin from the Malay Peninsula and part of that from the Netherlands East Indies is marketed by the Straits Trading Co. and the Eastern Smelting Co.; the remainder of the tin from the Netherlands East Indies is marketed through smelters at Batavia, that from Bolivia and Nigeria through England, Germany, and Belgium, and Chinese tin through Hong Kong. The smelting industry is controlled largely by British subjects. The sales agencies are highly organized, and the distributers enjoy many commercial advantages.

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[1] Figures on imports and exports to and from the United States compiled by J. A. Dorsey, of the Bureau of Mines, from records of the Bureau of Foreign and Domestic Commerce.

The year 1926 closed with a price of 66.75 cents per pound—high price for the year 72.5 cents—as compared with 63.62½ cents at the end of 1925. The maintained high price of 1926, in conjunction with a decided decrease in visible stocks, stimulated research work for substitutes throughout the year. The search for a tinless container may be successful at any time and result in the gradual release of a larger quantity of tin for other uses.

A fact of possible significance is that the imports of tin into Europe (the Continent) have not increased much since 1913. In that year the imports were 25,870 tons and in 1926, 26,261 tons. On the other hand, the United States imported 46,722 long tons in 1913 and 77,159 tons in 1926. High prices seem to have curtailed the consumption of tin on the Continent, and substitutes have replaced it for many uses.

DOMESTIC PRODUCTION

Tin mined in the United States (including Alaska), 1917–1926, in long tons

[Metallic tin obtainable from concentrates produced in tin mining]

1917	98
1918	62
1919	50
1920	20
1921	3. 6
1922	1. 3
1923	1. 7
1924	6. 3
1925	12. 3
1926	7. 14

Smelter output of metallic tin in the United States, 1917–1926, in long tons

1917	5, 415
1918	9, 182
1919	10, 925
1920	15, 761
1921	10, 305
1922	8, 132
1923	6, 666
1924	434
1925–26	-----

IMPORTS AND EXPORTS

Tin concentrate imported into the United States, 1917–1926

[General imports]

Year	Long tons	Value	Year	Long tons	Value
1917	8, 084	$4, 743, 099	1922	12, 325	$5, 504, 434
1918	16, 423	11, 444, 401	1923	2, 692	2, 169, 055
1919	17, 139	11, 871, 948	1924	[1] 155	71, 094
1920	30, 489	18, 795, 162	1925	[1] 191	98, 489
1921	13, 696	5, 672, 861	1926	[1] 303	187, 396

[1] Recorded as tin content.

Tin content of tin ore, cassiterite, and black oxide of tin imported into the United States, 1925–26, by countries

[General imports]

Country	1925		1926	
	Long tons	Value	Long tons	Value
Bolivia	26	$3,702	172	$101,436
Canada	63	35,468	93	61,108
Chile	5	3,225		
Cuba			(1)	54
Germany			34	23,190
Mexico			4	1,446
Netherlands			(1)	162
United Kingdom	97	56,094		
	191	98,489	303	187,396

[1] Less than 1 ton.

Metallic tin imported for consumption in the United States, 1917–1926

Year	Long tons	Value	Year	Long tons	Value
1917	64,434	$63,860,340	1922	60,193	$40,797,986
1918	63,620	93,144,218	1923	68,934	61,092,354
1919	40,044	50,890,019	1924	65,059	68,953,193
1920	56,067	73,440,872	1925	76,646	95,121,111
1921	24,197	16,645,719	1926	77,159	104,793,396

Metallic tin (bars, pigs, blocks, grains, and granulated) imported into the United States, 1925–26, by countries

[General imports]

Country	1925		1926	
	Long tons	Value	Long tons	Value
Africa (Portuguese East)	115	$131,770		
Australia	730	878,485	867	$1,204,155
Belgium	15	19,667	106	148,046
Bolivia			(1)	500
Canada	40	21,671	75	18,485
Chile			4	4,131
China	415	509,911	215	304,678
France	21	27,943	87	129,814
Germany	48	60,964	437	618,336
Guiana (British)			175	223,188
Hong Kong	3,709	4,401,050	2,549	3,514,606
India (British)	5	5,664		
Irish Free State			100	133,399
Italy	(1)	14		
Java and Madura	250	302,126	1,821	2,416,877
Malaya (British) (Straits Settlements)	49,075	60,612,397	42,786	56,326,508
Mexico	2	660	(1)	83
Miquelon and St. Pierre Islands	37	47,647		
Netherlands	4,135	5,264,951	7,173	10,420,732
Philippine Islands	50	59,146		
Sweden	135	169,877	(1)	37
United Kingdom	17,864	22,607,168	20,764	29,329,821
	76,646	95,121,111	77,159	104,793,396

[1] Less than 1 ton.

Metallic tin exported from the United States, 1917–1926, in long tons

Year	Domestic [1]	Foreign [2]	Year	Domestic [1]	Foreign [2]
1917	184	79	1922	804	294
1918	18	236	1923	750	296
1919	273	68	1924	419	540
1920	630	297	1925	361	571
1921	1,030	363	1926	675	1,305

[1] Imported as ore and exported as pigs, bars, etc.
[2] Imported as pigs, bars, etc., and exported as such.

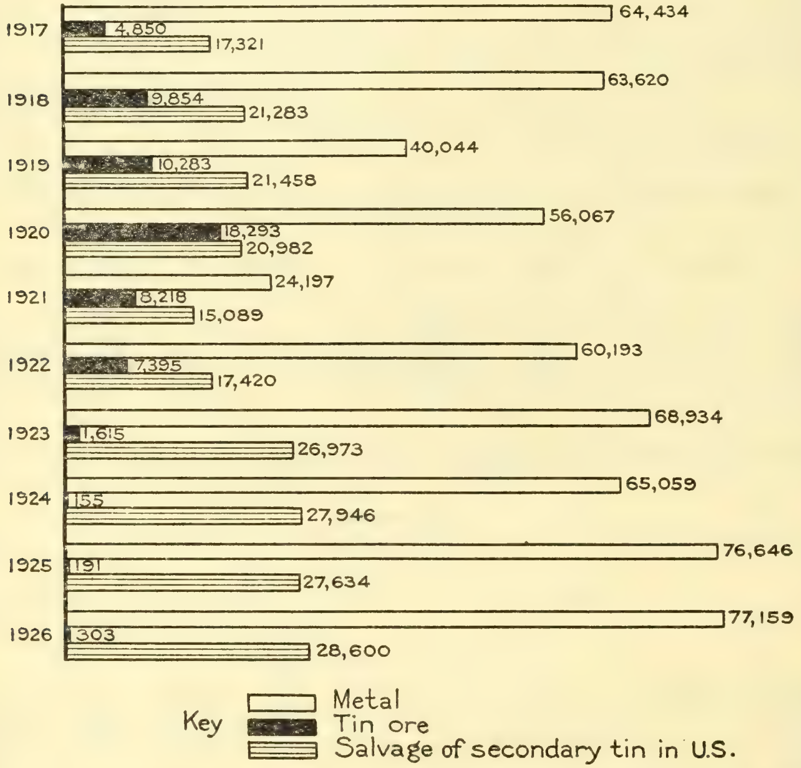

FIGURE 1.—Tin and estimated content of tin in ore imported, compared with secondary tin recovered in the United States, 1917–1926, in long tons

DOMESTIC MINING SITUATION

During 1926 there was some activity in the Harney Peak area, South Dakota. There has also been some interest in the Temescal mine in California; a company known as the United States Tin Co., with headquarters at Los Angeles, has been organized to work the property. In Cherokee County, S. C., and at Irish Creek, Va., there has also been some activity, but no production has been reported. The discovery of cassiterite at Taylor Creek, near Hot Springs, Sierra County, N. Mex., several years ago may yet prove to be of more than academic interest. Nuggets of high-grade cassiterite associated with hematite have been found in the beds of certain streams, and cassiterite has been found in place in a matrix of rhyolite. United States Geological Survey Bulletin 725, 1921, pages 347–359, gives the results of a 10-day reconnaissance in this area, under the title "The Taylor Creek tin deposits, New Mexico," by J. M. Hill.

In Alabama, 2 miles southeast of Ashland, Clay County, a considerable amount of diamond drilling was done in 1926 to determine the extent of the mineralized area, which is said to contain some tin.

PRINCIPAL PRODUCTS

Figure 2 graphically illustrates the result of an inquiry to more than 1,100 corporations and individuals, representing fully 90 per cent of the consumers of tin.

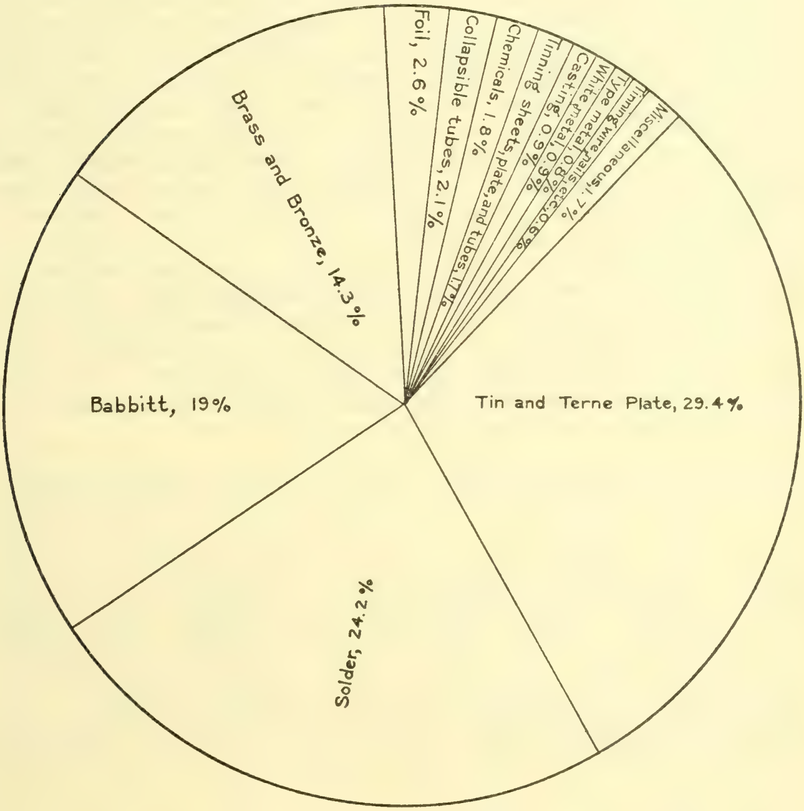

FIGURE 2.—Tin used in principal tin products of American industry in 1925. Included in the miscellaneous uses are the following: Soda-fountain supplies, britannia metal, bell metal, silk, composition, and fire sprinklers

TIN AND TERNE PLATE

United States.—According to the American Iron and Steel Institute the domestic output of tin plate in 1926 was the largest in the history of the industry, namely, 1,674,322 long tons, as compared with the war-time production in 1917—1,512,146 tons. This increased output may be attributed only in part to the disorganized condition of the Welsh tin-plate industry that followed the prolonged coal shortage in England. Expansion of the domestic market unquestionably occasioned the larger part of the increase. A study of the consumption in 1925 indicates that slightly more than 29 per cent of the available supply of tin is required by the tin-plate industry. Somewhat more than 45 per cent of the domestic tin plate is manufactured in the mills of the American Sheet & Tin Plate Co.

The amount of tin used per base box varies greatly in the American tin-plate industry, ranging between 2.6 and 1.4 pounds. The quality of the steel plate used largely determines the amount of tin necessary to make a more or less perfect coating. The physical qualities desired in the tin plate are imparted to the steel sheets by the thin skin or filament of tin, which actually forms an alloy with the steel. Tin in excess of the amount required to form this film does not add to the physical qualities or to the value from a consumer's standpoint.[2]

Since 1918 the tendency to manufacture tin plate and therefore tin containers within the boundaries of the consuming nations has been growing, a condition that is particularly true in regions where farm products are produced. Some countries have granted subsidies to establish and maintain this industry.

In 1925, 113,788 long tons of terneplate were manufactured; in 1926, 107,983 long tons. The decrease is probably due to the lighter demand in the automobile industry, which utilizes this product in the building of garages, etc. Terneplates are thin sheets of steel coated with an alloy of tin and lead (Pb=75 per cent, Sn=25 per cent). Coating varies, as a rule, from 8 pounds to 40 pounds per base box of 112 sheets, 20 by 20 inches in size.

Tin plate and terneplate produced in the United States, 1917–1926, in long tons [a]

Year	Tin plate	Terneplate	Total	Year	Tin plate	Terneplate	Total
1917	1, 443, 444	68, 702	1, 512, 146	1922	1, 208, 772	79, 123	1, 287, 895
1918	1, 435, 825	38, 114	1, 473, 939	1923	1, 414, 404	92, 458	1, 506, 862
1919	1, 074, 624	76, 723	1, 151, 347	1924	1, 328, 228	90, 426	1, 418, 654
1920	1, 374, 979	70, 566	1, 445, 545	1925	1, 544, 007	113, 788	1, 657, 795
1921	747, 911	46, 363	794, 274	1926	1, 674, 322	107, 984	1, 782, 306

[a] According to American Iron and Steel Institute, Special Statistical Bulletin No. 3, 1927.

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[2] Buck, D. M., "A symposium on the conservation of tin": Trans. Am. Inst. Min. and Met. Eng., vol. 60, 1919, pp. 168–171.

Tin plate, terneplate, and taggers tin imported into the United States, 1925–26, by countries and by districts

	1925		1926	
	Long tons	Value	Long tons	Value
COUNTRY				
Canada	14	$5,055	46	$14,590
Germany	1	173	1	359
Netherlands	(1)	56		
Sweden	(1)	5		
United Kingdom	365	102,088	2,113	282,534
Uruguay	1	247		
	381	107,624	2,160	297,483
DISTRICT				
Buffalo	(1)	186	1	339
Chicago	2	397		
Los Angeles	11	3,485	9	2,763
Maine and New Hampshire	(1)	11		
Massachusetts	22	6,092	4	1,070
Michigan			(1)	11
New Orleans	43	6,316	21	2,948
New York	71	22,789	51	15,491
Ohio	22	6,415	12	3,445
Oregon	8	2,497	5	1,728
Philadelphia	97	27,906	101	29,612
Pittsburgh	(1)	22	(1)	9
St. Lawrence	22	6,374	34	10,552
San Francisco	15	4,721	1,817	200,981
Vermont	7	1,947	17	5,356
Washington	5	1,851	17	2,314
Wisconsin	56	16,615	71	20,864
	381	107,624	2,160	297,483

[1] Less than 1 ton.

Tin plate, terneplate, and taggers tin exported from the United States, 1925–26, by countries and by districts

	1925		1926	
	Long tons	Value	Long tons	Value
COUNTRY				
North America:				
Canada	32,755	$3,925,952	46,954	$5,902,242
Central America—				
Costa Rica	9	1,395	21	3,069
Guatemala	53	6,680	53	6,159
Honduras	1	97	12	1,470
Nicaragua	9	1,195	2	262
Panama	22	3,664	4	882
Salvador	37	5,087	38	5,630
Mexico	5,278	598,537	9,351	1,021,330
Newfoundland and Labrador	113	12,664	143	16,258
West Indies—				
British—				
Jamaica	61	6,671	47	5,090
Trinidad and Tobago	1	178	83	9,204
Other	(1)	14	48	5,124
Cuba	4,803	552,738	3,125	339,360
Dominican Republic	35	5,061	14	2,194
Dutch	636	72,781	346	38,856
Haitian Republic	24	3,345	8	1,422
South America:				
Argentina	7,691	917,530	16,573	1,855,829
Bolivia	15	1,621	10	1,166
Brazil	4,050	448,956	5,857	624,104
Chile	5,721	647,295	7,031	757,577
Colombia	732	89,589	2,364	277,669
Ecuador	(1)	61	38	5,063
Guiana (Dutch)			22	2,510
Paraguay	(1)	37		
Peru	4,061	449,333	3,489	335,535
Uruguay	1,788	212,955	2,938	346,638
Venezuela	938	108,301	612	68,774

[1] Less than 1 ton.

Tin plate, terneplate, and taggers tin exported, etc.—**Continued**

	1925		1926	
	Long tons	Value	Long tons	Value
Europe:				
Austria	----------	----------	11	$1,242
Azores and Madeira Islands	(1)	$17	----------	----------
Belgium	152	14,730	277	29,826
Bulgaria	110	13,082	312	54,460
Denmark and Faroe Islands	----------	----------	1,835	207,591
Finland	----------	----------	15	1,511
France	(1)	53	142	18,076
Germany	(1)	10	8	1,477
Greece	3,618	404,519	1,935	209,956
Italy	7,528	937,462	10,126	1,162,175
Malta, Gozo, and Cyprus Islands	----------	----------	95	10,489
Netherlands	3	331	3,170	353,266
Norway	4	314	2,327	256,259
Portugal	482	54,178	517	58,250
Soviet Russia	----------	----------	237	26,277
Spain	64	7,591	1,222	139,043
Sweden	(1)	77	402	45,840
Turkey	1,628	177,664	2,615	292,991
United Kingdom	568	49,663	6,604	740,391
Asia:				
Ceylon	59	5,854	82	9,189
China	19,388	2,160,472	24,178	2,707,223
East Indies—				
British—				
India	9,471	1,093,605	14,592	1,669,791
Malaya (Straits Settlements)	1,487	177,723	6,881	745,271
Other	414	50,414	----------	----------
Netherlands	(1)	22	1,891	205,907
Hong Kong	1,727	201,942	910	101,509
Japan (including Chosen)	38,776	4,356,033	49,064	5,628,834
Java and Madura	423	51,142	6,475	733,158
Kwantung	----------	----------	29	3,580
Palestine	----------	----------	34	3,677
Persia	----------	----------	(1)	6
Philippine Islands	2,175	258,884	4,254	481,388
Soviet Russia	----------	----------	138	15,680
Turkey	384	37,451	377	44,808
Africa:				
British—				
East	----------	----------	159	16,376
South	1,016	114,336	1,810	204,427
Egypt	3,021	340,056	5,306	536,862
Oceania:				
British—				
Australia	39	5,439	3,121	359,385
New Zealand	14	1,914	447	56,744
French	1	175	----------	----------
	161,385	18,586,890	250,781	28,766,352
DISTRICT				
Alaska	(1)	20	----------	----------
Arizona	114	13,085	294	25,594
Buffalo	16,097	1,883,969	24,718	3,073,959
Chicago	1,620	203,257	865	110,918
Dakota	3,276	443,082	6,573	860,911
Duluth and Superior	356	46,121	528	68,800
El Paso	8	1,503	2	363
Georgia	----------	----------	67	7,048
Hawaii	121	10,808	11	920
Los Angeles	(1)	38	453	48,246
Maine and New Hampshire	538	68,723	147	16,028
Maryland	53,335	6,011,374	84,440	9,629,481
Massachusetts	12	1,697	----------	----------
Michigan	3,157	335,704	1,123	126,654
Mobile	318	41,220	46	6,385
New Orleans	1,493	185,382	150	10,362
New York	70,421	8,044,072	106,714	11,869,542
Ohio	7,113	868,658	11,956	1,520,256
Philadelphia	319	39,952	9,435	1,045,600
Rochester	1	239	(1)	89
Sabine	21	1,270	----------	----------
St. Lawrence	327	40,821	1,018	122,722
San Antonio	513	64,999	728	86,488
San Francisco	616	75,875	608	59,039
South Carolina	862	93,245	141	15,872
Vermont	28	3,523	54	1,023
Washington	719	108,253	710	60,052
	161,385	18,586,890	250,781	28,766,352

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[1] Less than 1 ton.

The American plants had a very full run in 1926, and their output of tin plate was 1,674,322 long tons—the highest figure ever reached in any one country and probably double England's. In 1925, 1,544,007 tons of tin plate were produced. Of the tin plate and terneplate produced in the United States in 1925 10 per cent—161,385 tons—was exported, as compared with 273 tons in 1900. The exports in 1926 were 250,781 tons.

Wales.—Early in 1926 an order for some 6,000 tons of tin plate for California was booked in Wales, as contrasted with the previous year's total exports to the United States, which were less than 500 tons.[3]

Tin plate, terneplate, and black plates exported from Wales, 1925–26, in long tons[1]

Destination	Tin plate and terneplate		Black plates	
	1925	1926	1925	1926
Europe and Mediterranean ports:				
Belgium	22,825	18,087	3,105	1,084
Denmark	12,053	10,404	1,329	436
France	16,761	22,581	1,889	808
Germany	16,927	5,634	4,655	334
Italy	26,691	11,786	175	2
Mediterranean ports	7,565	4,314	703	67
Netherlands	23,479	22,056	2,430	1,372
Norway	17,227	10,893	288	40
Portugal	13,422	12,274	280	212
Spain	20,062	15,002	1,344	460
Sweden	8,380	5,617	1,332	724
	185,392	138,648	17,530	5,539
Far East:				
China and Japan	27,661	14,817	49,737	32,075
Australia	16,911	12,170	1,176	181
Other Far East	25,462	16,842	1,635	4,191
	70,034	43,829	52,548	36,447
North America:				
United States		1,382		
Canada	34,387	24,926	3,838	2,152
	34,387	26,308	3,838	2,152
South America	42,507	17,364	3.031	616
All other destinations	16,175	11,010	1,601	642
	348,495	237,159	78,548	45,396

[1] Statistics compiled in the American consulate, Swansea, Wales, from data published daily in the South Wales Journal of Commerce (Cardiff), based on local customs returns. They are believed to be correct within 3 per cent.

Germany.—During the last 10 to 15 years the quantity of tin plate manufactured in Germany has increased somewhat; the output in 1912 was some 70,000 long tons and in 1925 was more than 90,000 tons. During this same period German imports dropped from 48,000 to 15,000 tons. At present Germany is endeavoring to develop her export trade. It is stated the quality of the German plates has been reported as not universally satisfactory.[3]

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[3] Mining Journal (London), "Welsh tin-plate trade in 1926": Vol. 156, Jan. 29, 1927, p. 100.

In September, 1913, the German tin-plate makers produced 6,921 tons. In September, 1925, the output was 11,911 tons. For the first nine months of 1926 the exports from Germany were 12,295 tons, as compared with 8,370 tons for the corresponding period in 1925. During 1926 a small tonnage of electrolytic tin was produced by the Berzelius Smelter. The Wilhelmsburg plant, controlled by London interests, resumed production in the latter part of 1926 with a monthly output of 300 tons.

India.—In India imported tin plate has been assessed an increased duty of Rs. 60 to 85 per ton—roughly 1s. 9d. per base box, or nearly £80,000 per year extra to be paid by Indian consumers (based on our 1925 export figures). It is stated that the Indian works turned out nearly 30,000 tons in 1925 and expected to reach 35,000 tons in 1926. Because of the hot climate the works have met unforeseen difficulties in the cooling of the plates after annealing, and in the too-speedy evaporation of moisture causing stains in tinning. The remedy involves special spraying and, of course, extra expense.

In 1922 the Tin Plate Co. of India began to manufacture tin plate. In 1923 the output of India was 9,000 tons; in 1924, 20,763 tons; in 1925, 29,555 tons; and in 1926 it will probably reach 35,000 tons. India's consumption of tin plate comprising imports of tin plate and the output of the Tin Plate Co. for 1923–24 was 56,000 tons; 1924–25, 59,000 tons; and 1925–26, 60,000 tons.[5]

The Indian tariff board, in a recent report concerning a statutory inquiry on the granting of continued protection to the steel industry in India after March 31, 1927, condemns the existing system of bounties but recommends continued protection to the steel industry in the form of a scale of duties in smaller amounts than those in force under the present schedule.

The board also reported that the Tin Plate Co. of India increased production and reduced work costs in 1926 and in consequence recommends that the protective duty on tin plate be reduced from Rs. 85 to 48 per ton.

The Government of India announces that a bill embodying the chief recommendations of the tariff board[6] will be introduced into the coming session of the legislature.

Spain.—The Sociedad Industrial Asturiana is endeavoring to develop its sales by means of its tin-plate factory, the third of its kind in Spain, where tin plate finds an assured outlet in the preserved foodstuff and olive-oil industries.[7]

Russia.—Official returns supplied by the supreme council of national economy show that there are three tin-plate works in Russia, with a combined output of 29,800 tons a year.

Other countries.—Japan has an annual output capacity of 100,000 tons of tin plate, France in the neighborhood of 50,000 tons, and Italy about 50,000 tons. Tin plate is produced also in Czechoslovakia, Belgium, Norway, and Rumania.

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[5] Iron and Coal Trades Review, Indian notes: Vol. 64, Apr. 15, 1927, p. 632.

[6] Commerce Repts., Jan. 24, 1927, Cable from Trade Commissioner C. B. Spofford, jr., Calcutta, Jan. 14.

[7] Mining Journal (London), "Spanish tin plate": Vol. 156, Jan. 29, 1927, p. 101.

SOLDER

The increase from year to year in the consumption of solder is probably due to the automobile industry and to the introduction and expansion in the use in the past few years of individual refrigeration plants, in whose manufacture an ever-increasing amount of solder is utilized.

OTHER PRODUCTS

The estimated amount of tin consumed in bearing metal, bronze, brass, foil, collapsible tubes, etc., in 1926, shows a normal increase over 1925 thus following general business conditions.

SUBSTITUTES

The ever-increasing price of tin decade by decade has gradually forced research work along the lines of substitution. The National Canners Association has been experimenting with what it terms the "tinless can," consisting of sheet steel coated with various organic lacquers that are resistent to fruit and vegetable acids. In the Iron Age of March 24, 1927, pages 843–844, C. L. Mantell discusses tinless containers under the title "Is the tinless can a possibility?"

The Census Bureau reports that the value of the principal classes of foods preserved in tin cans in the United States during 1925 was $811,981,924. This total is made up as follows: Vegetables and soups, 101,024,212 standard cases, valued at $282,891,245; fruits, 25,375,534 standard cases, valued at $102,638,209; fish and oysters, 14,302,084 standard cases, valued at $79,452,994; and other products, including milk, meat, pickles, sauces, preserves, jellies, jams, etc., for which number of cases is not specified, valued at $346,999,476.

In the manufacture of collapsible tubes the major part of the output is made from pure Banka or Billiton tin, with a fraction of 1 per cent of antimony added to harden the alloy slightly. The minor part of the output is manufactured with lead as a base; the lead forms a core and thin tin sheets the surfaces. The percentage by weight of tin consumed is one-half of 1 per cent.[8] The tin coating applied gives the necessary nontoxic lining and prevents contamination of the material with which the tubes are filled.

A cheap substitute for terneplate is made by coating iron with antimony and depositing lead over the whole.[9]

As containers of cosmetics lead tubes have the advantage of being the cheapest kind of metal that can be used but the disadvantage of being harmful to consumers. A thin coating of tin obviates such dangers.

Zirconium oxide has come into use as a substitute for tin oxide in ceramic glazes. The substitution is said to effect considerable economy and to give a ware equal or superior in quality to that produced with tin. The zirconium oxide thus used is obtained from zircon, a by-product in the mining of ilmenite for use in titanium oxide pigments, and the increased manufacture of titanium oxide is due to its use in paint as a substitute for white lead. Thus, from the substitution of one metal for another, a by-product may result that may become a commercial substitute for still another metal.

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[8] Mundey, A. H., Tin and the Tin Industry, pp. 112–113.

[9] Baskerville, C., Jour. India Eng. Chem., vol. 12, pt. 2, 1920, p. 152.

During the past 10 years the Bell Telephone System has been gradually substituting antimony for tin in lead-cable sheathings, thus realizing a saving of over $11,000,000 in the last 13 years.[10]

Nickel is also being substituted for a part of the tin in brass and bronze.

Roller bearings in railway cars and other heavy mechanical and vehicular equipment may be considered as substitutes for babbitt and other bearing metals.

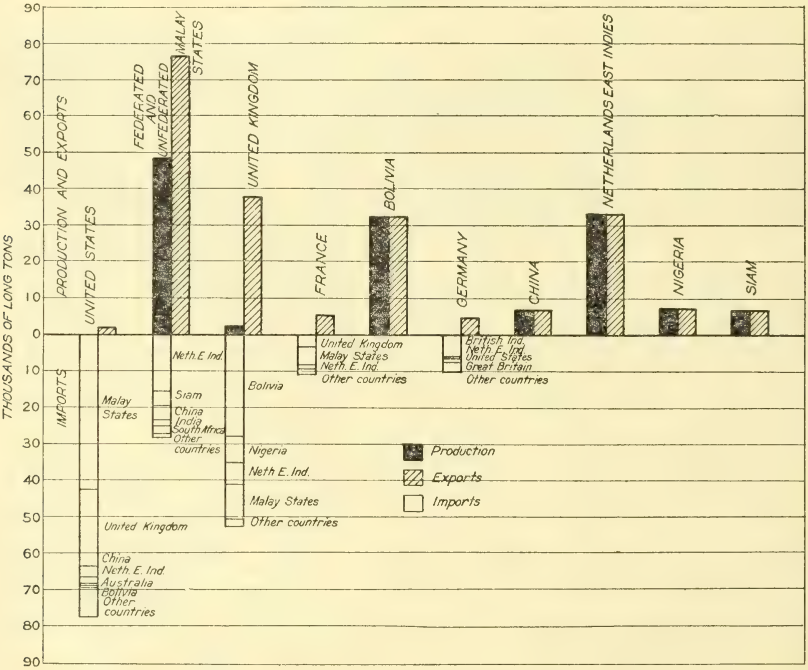

FIGURE 3.—Production, exports, and imports, figured as metallic tin in long tons, of major producing and consuming countries in 1926

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[10] Iron Age, "Tin substitutes increasing": Vol. 119, Jan. 6, 1927, p. 56.

WORLD PRODUCTION AND RESOURCES

World's production of tin, 1922–1926, by countries, in long tons[1]

[Tin content of ore]

Country	1922	1923	1924	1925	1926
Australia	2,570	3,283	3,069	3,016	3,000
Belgian Congo [2]	898	974	994	1,226	[3] 1,500
Bolivia [2]	31,583	29,785	31,610	32,224	33,862
China [2]	9,032	7,936	6,993	8,884	6,538
England—Cornwall	370	1,021	1,986	2,339	2,064
India (British)	1,530	1,405	1,375	1,616	1,296
Indo-China	(4)	(4)	(4)	582	(5)
Malay States:					
Federated [2]	35,286	37,649	44,043	45,926	45,948
Unfederated [2]	1,937	1,727	2,870	2,146	[3] 2,220
Netherlands East Indies	29,253	29,093	31,906	31,566	32,697
Nigeria	5,123	5,860	6,200	5,991	[2] 7,042
Portugal	(4)	(4)	(4)	559	(5)
Siam [6]	5,103	7,690	7,946	7,878	[3] 8,000
Union of South Africa	485	918	1,162	1,147	1,124
Other countries [7]	1,900	800	1,500	1,000	1,000
	125,070	128,141	141,654	146,100	147,300

[1] Compiled by L. M. Jones, of the Bureau of Mines.
[2] Exports.
[3] Estimated.
[4] Less than 500 tons; included under "Other countries."
[5] Estimate included in total.
[6] Exports for year ended March 31 of year following that stated.
[7] Includes countries producing less than 500 tons.

Figure 3 illustrates the interdependence of nations for this commodity and clearly shows that the producing countries are not the consumers.

FEDERATED MALAY STATES

For many years the Federated Malay States has been the largest producer of tin in the world. In 1926 it contributed approximately 31 per cent of the world's output. The output in 1926 was not so great as was anticipated and exceeded that in 1925 by only 22 tons. The average price of Straits tin in New York for the year was 7.4 cents per pound higher than that of 1925; thus the price was materially higher, although production was relatively constant. The fact that the increased output predicted did not materialize in 1926 might be attributed in part to the severe floods that interfered with production in the Perak district in December. However, this factor was probably of minor consequence, and the relatively constant production is due in the main to rapid exhaustion of the areas minable by hydraulic methods. The history of placer mining for gold in California indicates, in part at least, what may ultimately be the history of the Malayan tin placers. The introduction of dredging in the Malay Peninsula in 1912 had its parallel in the history of gold dredging in the Oroville district of California. With the advent of gold dredging in California in 1900 many maintained that the expansion of the industry would in a comparatively short time increase the output of gold until it might compare favorably with the output of earlier placer mining. The rapidly increasing number of dredges in the Malay States has evoked similar statements, and little consideration is given the limitations of dredging other than those of immediate interest.

For a dredging operation to be a commercial success several conditions must be satisfied. Some of the conditions that determine success are the quantity and value of material available, the depth to bedrock (the present economic limit seems to be between 8 and 120 feet), the character of the bedrock, the character (compactness, and size of pebbles) of the gravel, the character of clay encountered, and the porosity of the ground as it affects the amount of water required. The investment necessary, ordinarily involves acquiring a large acreage to insure the retirement of the investment with interest; therefore a comparatively large acreage must be nonproductive for some time. So far, dredges have not been installed in the Malay Peninsula rapidly enough to increase output materially.

The constantly advancing price of tin permits the operator to dredge ground of lower and lower grade at a profit, but once a dredge is installed and acreage acquired the gradual increase in price is not an inducement to install additional dredges but rather to dredge lower-grade ground; thus, over a period of time a maintained yardage may be treated with an actual decrease in metallic output. On the other hand, although the working of low-grade ground will not necessarily increase the annual production of metal, it will prolong the life of the industry. The decrease in the grade of material handled is indicated by the reports of the Department of Mines[11] of the Federated Malay States.

These publications report, under the caption "Output of ore per unit employed," 134.67 pounds produced per head in 1926, as compared with 146.66 pounds in 1925, 184 pounds in 1924, and 169.33 pounds in 1923.

At the annual meeting of the Chamber of Mines, Federated Malay States, in Ipoh, June 3, 1926, A. J. Kelman stated[12] that the revenue collected by the Government through the export duty on tin was $14,000,633. During his address he said:

> I am of the opinion that in the near future this chamber should approach Government with a view to a reduction of the royalty on low-grade properties, and thus to encourage the working of low-grade ground, on which the life of the alluvial areas depends.

From the rapidity with which the Chinese in the Federated Malay States have been adopting more up-to-date methods of mining that are less extravagant in their use of labor, as indicated by the increased installation of mechanical power for driving bedrock or gravel pumps, the inference may be drawn that the increased production of 1925 was partly, at least, due to the large number of gravel pumps used and the lack of any material increase in 1926 was partly due to the fact that areas suitable for working by gravel pumps are being rapidly exhausted. The output from the increased installation of bucket dredges has not offset the decrease due to the exhaustion of placer ground mined by simpler methods.

In 1926 the Government of the Federated Malay States granted to the Perak Hydroelectric Power Co., for 80 years, the exclusive right to supply power to the Malayan tin industry over an area of

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[11] Supplement to the Federated Malay States Government Gazette, May 14, 1926, Federated Malay States. Report on the Administration of the Mines Department and on the Mining Industries for the year 1925.

[12] Mining Journal (London), Federated Malay States, Annual Meeting Chamber of Mines: Vol. 154, July 3, 1926, p. 552.

3,000 square miles, from its hydroëlectric plant on the Perak River. At present there are over 70 mines within the concession.

Tin reserves.—In considering the future of tin mining in the Malay Peninsula, consideration must be given to the fact that the Kinta district in the State of Perak has in the past produced 60 to 68 per cent of the total output of British Malaya. This district is only about 36 miles long and 25 miles wide at its widest part and has been intensively worked for many years. Its output alone represents about 15 per cent of the total world's annual production.[13]

The tin exports of the Federated Malay States for 1924, 1925, and 1926, by months, in long tons, according to the Mining Journal, London, January 15, 1927, page 49, are as follows:

Tin exported from Federated Malay States, 1924–26, by months, in long tons

Month	1924	1925	1926
January	3,934	4,081	3,963
February	3,246	3,362	3,546
March	3,364	4,031	3,501
April	3,327	3,762	3,667
May	3,852	3,810	3,692
June	3,493	3,995	4,074
July	3,735	4,242	4,086
August	3,539	3,715	3,766
September	3,656	3,988	3,899
October	3,949	3,872	3,886
November	3,733	3,543	4,148
December	4,215	3,524	3,718
	44,043	45,925	45,946

UNFEDERATED MALAY STATES

The 1926 smelter receipts were 2,220 long tons of tin, as compared with 2,215 tons in 1925.

NETHERLANDS EAST INDIES

In 1925 and 1926 the Netherlands East Indies was the third largest producer in the world. In 1925 and 1926 Bolivia was the second largest producer. Practically all the output comes from placers; approximately two-thirds of it comes from the Island of Banka and slightly less than one-third from Billiton. The remainder is made up by a small production from Singkep and from the Stannum Mining Co., organized by the directors of the Billiton Co., from its property near Bangkinang on the Island of Sumatra. In the latter part of 1926 a company was organized by the Billiton Joint Mining Co. and the Billiton Co. called the Netherlands India Tin Exploitation Co. The object of the company was to exploit the tin fields on the islands of Karimoen and Koendoer.[14]

Banka.—On the Island of Banka during the fiscal year beginning March 1, 1925, the Government was operating 70 large and 189 small tin mines, in which 265 salaried employees and 20,085 Chinese and Japanese laborers were employed. Before the World War the entire production of the Island of Banka was shipped to Holland

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[13] Jones, W. L., Tin Fields of the World, 1925, pp. 167–182.

[14] Mining Journal (London), "Tin in the Dutch East Indies": Vol. 156, Feb. 5, 1927, p. 117. Abstract from quarterly report of the "Amsterdamsche Bank," written by A. Guyot van der Ham.

and sold by auction in Amsterdam and Rotterdam by the Netherlands Trading Co. During 1926 a total of 16,139 long tons of tin was shipped from the Island of Banka. As against this, however, ore shipments in 1926 from the Netherlands East Indies into the Straits Settlements contained 26,546 long tons of tin, as compared with 27,876 tons in 1925, a decline of 1,330 tons, entirely due to smaller receipts from Banka and Billiton.[15]

The care with which tin mining has been fostered by the Netherlands Government in the Island of Banka has made possible the remarkable profit of 43,205,878 florins ($17,368,562) for the year ended February, 1926. This return was made on a capital of 14,034,273 florins[16] ($5,641,778).

The actual output of tin for the year ended February 28, 1926, was 20,507 tons; sales amounted to 19,709 tons. Of this amount 5,503 tons were sold as Straits tin. At present six separate smelters are operating in the Netherlands East Indies in the following districts: Soengailiat, Pangkalpinang, Muntok, Belinjoe, Toboali, and Pajoeng.

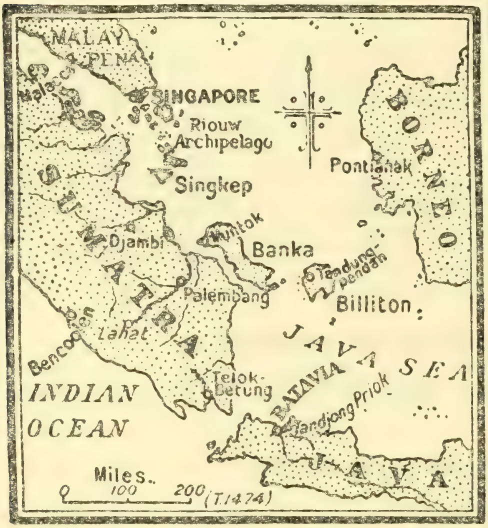

FIGURE 4.—Map of the tin islands of the Netherlands East Indies

Billiton.—On June 1, 1923, at the expiration of the concession to the Billiton Co. by the Netherlands East Indies, a joint company was formed, known as the Billiton Joint Mining Co., in which the Government is directly interested.[17] Of the total 1926 output of the Netherlands East Indies, 16,445 tons were handled by the Netherlands East Indies Government.

During 1926 the construction of a smelter was undertaken[18] at Tandjong Priok, the port of Batavia. When this smelter is completed the bulk of the output from the Netherlands East Indies will probably be treated there, although there may be an advantage, on account of transportation, in shipping the output from Singkep and other Riouw Islands to Singapore, as in the past.

BOLIVIA

In 1926 the exports of tin from Bolivia were 33,862 long tons, as compared with 32,224 tons in 1925, an increase of 1,638 tons. The shipments were made to the following destinations: United Kingdom,

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[15] Mining Journal (London), vol. 156, Jan. 15, 1927, p. 49.

[16] Mining Journal (London), " Tin industry in Banka " : Vol. 155, Oct. 2, 1926, p. 792.

[17] Mining Journal (London), vol. 156, Feb. 5, 1927, p. 117.

[18] The Times Trade and Engineering Supplement, " Netherlands East Indies ; Tin mining " : Oct. 30, 1926, p. 158. (From a correspondent.)

30,095 tons; Germany (Hamburg), 3,703 tons; Chile, 33 tons; United States of America, 13 tons; Austria, 12 tons; and France, 6 tons. England shipped to Germany 240 tons of tin; thus the United Kingdom smelted 88 per cent of the Bolivian output in 1926, as against over 99 per cent in 1925. This change has been in part due to shipments made by the Patiño Mines Co. (Ltd.) to the Williams-Harvey plant on the Continent.

During 1926 dredging by the Guggenheim Mining Co. of the stream deposits, in which are incorporated tailings from the Potosi mines, became productive. The output has been estimated at 100 tons per month of "barilla," containing 60 per cent of metallic tin. This output virtually constitutes the entire tonnage of metallic tin from other than lode mines. The decrease in output per annum may be attributed largely to the increased price of tin. This seemingly contradictory statement may be explained by the fact that higher prices of tin allow the mining companies to work lower-grade ore successfully; thus, although the tonnage mined in any given year may equal or exceed that of the previous year, the output of metal may be less.

The annual report of the Patiño Mines & Enterprises Consolidated (Inc.) for 1926 shows a total of 331,038.08 metric tons of ore mined assaying 4.476 per cent of tin. The mill production was 16,667.4 metric tons of concentrates averaging 59.22 per cent of tin. The costs, including all actual charges up to and including realization, were given as 30.948 cents United States currency, and the receipts or proceeds equaled 60.56 cents United States currency per pound of fine tin (without deduction for depreciation or taxes). The costs per long ton of fine tin in pounds sterling were given as £142 18s. 7d. and the proceeds £279 14s. 2d.

With regard to conservation, the Bolivian mines, like those of Malaya, may show that increased price does not mean increased rate of production, but rather, as with Malayan dredging, a longer life for the enterprise and over the extended period an increase in the total yield. In Bolivia it would require a decided increase in the price of tin to justify the capital investment necessary to increase materially the output of what are now the chief producers. The hope of such an increase depends on the discovery of extensive low-grade disseminated deposits, a metallurgical method for reducing the ore commercially, and the finding of ore bodies that may not outcrop. The latter proviso is suggested in an article by F. R. Koeberlin, "Geologic criteria for large-scale tin prospecting in Bolivia," which appeared in the Engineering and Mining Journal of February 12, 1927.

NIGERIA

In 1926 the exports of tin from Nigeria were 7,042 long tons, as compared with 6,506 tons in 1925, an increase of 536 tons. The tin deposits of Nigeria have been found in an area of approximately 9,000 square miles. The richest deposits are on the Bauchi Plateau of the Bauchi Province. Deposits of lower grade are found in the northern tin fields of Bauchi, Kano, and Zaria Provinces and in the Nassarawa Province. More than 50 per cent of the Nigerian exports come from three mines, those of the Ropp Co., the Keffi

Consolidated Co., and the Northern Nigeria (Bauchi) Co. The factors that militate against low-cost production are the high transportation charges, distance from smelting centers, and Government royalties. The present freight rate from the railhead to the steamers at Lagos, including bills of lading, harbor dues, and handling, totals £12 per ton,[19] equivalent to 3½d. per ton-mile for the 750 miles. This condition will be partly relieved with completion of the Port Harcourt line. Practically no tin ores or concentrates are smelted in Nigeria, as the output goes to Liverpool; therefore the crude ores are saddled with heavy railway and ocean rates in comparison with the comparatively short haul enjoyed by the Malayan companies because of their proximity to smelters.

The royalties now in effect are as follows:

When London price is less than—	Rates of royalty (per cent on the value)
180 pounds	2
180 pounds but less than 190	3
190 pounds but less than 200	4
200 pounds but less than 220	5
220 pounds but less than 240	6
240 pounds but less than 260	7
260 pounds but less than 280	8
280 pounds but less than 300	9
300 pounds or upward	10

There are four different sets of mining titles, as follows:

(1) Prospecting right. This entitles the holder to search for mineralized ground or to prospect. The fee is £5 per annum.

(2) Exclusive prospecting license. This privilege is granted for one year from date subject to renewal to further terms of one year each, and at the discretion of the Government a fourth year may be granted if it can be shown that prospecting has been seriously hindered by circumstances beyond the control of the licensee. The rental is £5 per annum per square mile or part of a square mile.

(3) Mining lease. This entitles the owner to mine and to ship tin ore from the ground covered by the title. The holder of a prospecting right may apply for ground under mining lease direct, but generally a mining lease is applied for after an area has been prospected under an exclusive prospecting license. The maximum period of a mining lease is 21 years, and the rental is 5s. per acre or part of an acre per annum, plus 2d. per acre or part of an acre surface rent.

(4) Mining right. As under (3), this right entitles the holder to mine and ship tin. The maximum length of any mining right is 1 mile measured along the bed of the stream, and the width is 200 yards. The rental is £1 per hundred yards of length or part thereof per annum, plus 2d. surface rent.

The wet and dry seasons are one of the severe handicaps to mining in Nigeria. In normal years the rains begin in March and continue intermittently until early October. The maximum rainfall usually occurs in the months of July, August, and September. As the rainfall is seldom general over the whole plateau but is usually local, one property may have a fair water supply during the rainy season and the adjoining property may have dry-season conditions.

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[19] Broadbridge, G. T., "Nigeria's tin alluvials": Financial Times, Nov. 8, 1926.

SIAM

The consumption of tin in Siam is virtually negligible, so that it may be said that the entire output is exported, partly to Penang and partly to Singapore. The tin is shipped mainly in the form of concentrates, as the amount smelted in the country by Chinese smelters is now almost negligible. The concentrates as shipped usually contain 70 per cent of tin. In 1907 the first bucket dredge was installed by the Tongkah Harbour Tin Dredging Co., an Australian firm.[20] Dredging was begun in Bhuket Bay by the first dredge installed in the Far East.

The success of this enterprise led to the installation of other dredges, and more than 40 per cent of the output now comes from dredging; the balance is derived from various methods of placer mining.

As in the Malay States, the largest producing deposits are on the west side of the main range. Monthon Puket produces by far the major portion of the output. Tin is present in the Siamese possessions in the following localities:

East coast	West coast
Ratburi	Kra
Bangtaphan	Renong
Langsuan	Takuapar
Chaiya	Panga
Bandon	Takuatung
Lakon	Puket
Jalar	Trang
Ranjeh	Stul
Rahman	Kopah

The exports for the year ended March 31, 1926, were 7,878 long tons, as compared with an estimated output of 8,000 tons for the year ended March 31, 1927.

Some details of four of the large dredging companies are given below:

Bangrin Tin Dredging Co. (Ltd.).—The property consists of 300 acres in the Province of Renong, western Siam, and is estimated to contain 16,000,000 cubic yards of ground carrying three-fourths pound of tin ore per cubic yard. The property is equipped with an 8-foot bucket dredge with a capacity of 150,000 yards per month.

Renong Tin Dredging Co. (Ltd.).—The property consists of 460 acres on the Renong and Pak Chan Rivers, Siam. Two dredges are at work on the area, which is approaching exhaustion. In addition to the acreage mentioned the company controls 1,000 acres in the Rasa district, State of Selangor, Federated Malay States. The present rate of production is approximately 600 tons of tin ore per annum from the property in Siam.

The Siamese Tin Dredging Syndicate.—The property contains 9,500,000 cubic yards in the Renong mining district and the Peek and Plaiwah areas in the district of Kopah, estimated to contain 14,000,000 and 12,500,000 cubic yards, respectively, averaging eight-tenths pound of tin concentrate per cubic yard. Two dredges, with a combined capacity of 2,400,000 cubic yards per annum, were installed in

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[20] Far Eastern Review, December, 1926, p. 584.

1925. The estimated per annum rate of production will be slightly more than 1,000 tons of metallic tin.

Tongkah Harbour Tin Dredging Co.—The property is situated in Siam, 200 miles north of Penang on the west side of the Malay Peninsula, and consists of 5,350 acres. Four dredges are at work, producing at the rate of approximately 400 tons of tin concentrate per annum.

The western seaboard is by far the most important tin-mining district in Siam and has contributed more than 80 per cent of the total production of that country. The Importers and Exporters Directory for Siam, second edition, published December, 1924, says:

> The Changvad, comprising the Island of Puket, formerly the most important tin-mining center and responsible for more than half the output of the whole country, is becoming less productive and, though doubtless there still remain certain new areas there capable of being mined at a profit, it seems clear that the time is not far off when the island will be worked out. Prospects on the mainland are, however, constantly improving and appear to indicate a long and prosperous future for Siamese tin mining.

The following figures were given in the article cited above:

Tin obtained in Siam from dredging and other sources, 1916–1924, in long tons

Fiscal year	Dredging	Other sources
1916–17	2,815	5,950
1917–18	3,056	6,098
1918–19	3,103	5,732
1919–20	4,464	4,078
1920–21	3,513	2,689
1921–22	3,030	3,121
1922–23	2,859	4,120
1923–24	2,615	5,004

The table shows that in 1919–20 dredging furnished more than 52 per cent of the total output and in 1923–24 represented about one-third.

CHINA

Data on the production of tin in China are not available at present. Except for 36 tons shipped to Tongking, French Indo-China, all of the tin exported in 1926 went to Hong Kong. The mining of tin in China is at present confined to the Province of Yunnan, and the proceeds from the tin sales form the financial basis upon which import trade depends. The exports in 1926 were 6,538[21] long tons, as compared with 8,884 tons in 1925, showing a decrease of 2,346 tons. This decrease may be partly attributed to the lack of rain water used for the washing of ore, the scarcity of charcoal for smelting, and the increased depth of the mines. J. E. Jacobs, consul, Yunnanfu, China, reports on March 12, 1927, that the Kochiu Tin Trading Co. had decided to use modern mining methods and machinery. A working shaft is to be sunk 1,500 feet.

Virtually the entire production of China is now refined in Hong Kong. From Hong Kong the tin is shipped to other parts of China, where it is largely used in the manufacture of sacrificial paper.

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[21] Maritime Customs, Foreign Trade of China.

During 1926 there has been some activity in the Fu Chuan district, southwestern China. A description of the deposits therein, entitled "Tin and coal deposits of the Fu Chuan district, China," by M. B. Yung, Hong Kong, China, appeared in The Transactions of the American Institute of Mining Engineers, volume 50, 1914, pages 689 to 697.

ENGLAND (CORNWALL)

In 1926 the output of tin in Cornwall was 2,064 long tons, as compared with 2,339 tons in 1925. The output of 1927 will probably be somewhat larger, due to successful exploration work undertaken in 1926.

The high price of tin in 1926 has fostered the mining of tin in Cornwall. The only profitable enterprise, however, has been the East pool near Camborne. At the famous Dolcoath mine the old workings have been abandoned and a vertical shaft has been sunk in new ground near the Roskear vein. A crosscut from the bottom of the shaft has intersected a lode 13 feet wide, carrying 33 pounds of black tin per ton of ore. The South Crofty was on a dividend-paying basis for the first two quarters of the year, but business disarrangement, following the general coal strike, stopped profits. The Geevor has been developed and has met expenses.[22]

JAPAN

The mines in Kyushu, Province of Satsuma, were for many years the most important in Japan. A report issued by the association of the mine owners of Japan at the Philadelphia Sesquicentennial Exposition sets forth that the main production now comes from farther north. It says:

> In 1909, however, tin deposit was discovered at the Akenobe mine in Hyogo Prefecture. Since this discovery Japan's tin production experienced a rapid increase in amount, in 1911 the total production being estimated at the large amount of 340 tons. The following table gives the annual production of tin:

	1922 (pounds)	1923 (pounds)	1924 (pounds)
Akenobe mine in Hyogo Prefecture	655, 748	643, 874	739, 679
Suzuyama mine in Kagoshima Prefecture	6, 115	23, 796	30, 486

The tin at the Akenobe mine is in a quartz vein containing silver and copper, and its production is incidental.

BURMA

The policy of the Government concerning mining in Burma has practically eliminated development by Australian mining companies, which have been forced to confine their efforts to the Federated Malay States and Siam. In Lower Burma there seem to be tin-bearing areas awaiting development.

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[22] Engineering and Mining Journal, "Mining and other affairs in London": Vol. 123, 1927, p. 13.

CANADA

Cassiterite is found in the ores of the Sullivan mine, British Columbia. The occurrence of cassiterite in the mixed sulphides of the Sullivan mine suggests the advisability of having a careful analysis made to determine definitely the mineral content of ores of this character. The average tin content of ores in the Sullivan mine is approximately 0.05 per cent in the run-of-mine ore, and with this low content a recovery of 1¼ to 2 tons of cassiterite per day as a table product is possible.

OTHER COUNTRIES

The maintained high price during the year has encouraged extremely active prospecting for tin in other countries.

PRICES

The effect of the further depletion of the world's visible supply of tin during 1926 is reflected in the average price at New York for the year of 65.3 cents per pound. According to Metal Statistics, of the American Metal Market, the visible supply of tin on December 31, 1924, was 25,088 long tons; on December 31, 1925, 18,024 tons; and on December 31, 1926, it was 16,326 tons, a decrease in 1926 of 9 per cent from that of 1925 and 35 per cent from that of 1924.

The average London price per long ton of tin in 1926 was £291 3s.

Monthly price of Straits tin for prompt delivery in New York, 1924–1926, in cents per pound[1]

	1924			1925			1926		
	High	Low	Average	High	Low	Average	High	Low	Average
January	51. 00	47. 12½	48. 73	60. 50	56. 00	58. 23	63. 50	60. 75	62. 27
February	55. 75	49. 37½	53. 43	57. 75	56. 30	57. 08	64. 50	62. 00	63. 62
March	58. 75	49. 00	55. 01	55. 25	52. 12½	53. 72	66. 00	63. 00	64. 49
April	54. 00	48. 00	50. 02	56. 00	50. 00	52. 21	64. 25	62. 25	63. 38
May	48. 62½	40. 00	44. 17	56. 25	53. 37½	54. 67	64. 50	60. 50	62. 44
June	44. 50	40. 87½	42. 72	57. 12½	54. 87½	55. 92	62. 12½	58. 50	60. 62
July	49. 25	43. 25	46. 25	59. 37½	57. 25	58. 08	64. 25	61. 70	63. 07
August	53. 25	49. 62½	51. 93	59. 37½	56. 75	58. 18	66. 25	64. 12½	65. 28
September	53. 37½	45. 62½	49. 13	59. 87½	56. 50	58. 27	71. 00	65. 87½	68. 92
October	53. 12½	48. 37½	50. 56	64. 12½	60. 00	62. 23	71. 75	68. 25	70. 31
November	54. 70	53. 37½	54. 24	64. 50	62. 12½	63. 27	72. 50	68. 00	70. 67
December	59. 00	54. 75	56. 21	63. 75	61. 25	62. 93	71. 25	66. 50	68. 47
Year	59. 00	40. 00	50. 20	64. 50	50. 00	57. 90	72. 50	58. 50	65. 30

[1] Metal Statistics, 1927, pp. 333 and 335.

BAUXITE AND ALUMINUM

By JAMES M. HILL [1]

BAUXITE

DOMESTIC PRODUCTION—IMPORTS AND EXPORTS

In 1926 the bauxite output of the United States was 392,250 long tons, valued at $2,415,200, or an increase of 24 per cent in quantity and 21 per cent in value as compared with 1925. Imports of bauxite in 1926 aggregated 281,644 long tons, valued at $1,187,497, or a decrease of 20 per cent in quantity as compared with 1925.

Bauxite produced in the United States, 1922–1926

Year	Georgia, Alabama,[1] and Tennessee		Arkansas		Total	
	Long tons	Value [2]	Long tons	Value [2]	Long tons	Value [2]
1922	42, 810	$329, 440	266, 790	$1, 682, 890	309, 600	$2, 012, 330
1923	28, 810	176, 030	493, 880	2, 980, 580	522, 690	3, 156, 610
1924	19, 940	156, 990	327, 630	1, 981, 000	347, 570	2, 137, 990
1925	20, 220	109, 800	296, 320	1, 878, 450	316, 540	1, 988, 250
1926	20, 680	116, 650	371, 570	2, 298, 550	392, 250	2, 415, 200

[1] No production from Alabama in 1924, 1925, and 1926.
[2] Value f. o. b. mines.

Bauxite imported into and bauxite and bauxite concentrates exported from the United States, 1922–1926

Year	Imports for consumption		Exports (including bauxite concentrates)	
	Long tons	Value	Long tons	Value
1922	23, 656	$93, 805	19, 617	$961, 208
1923	119, 020	593, 882	78, 560	3, 380, 486
1924	201, 974	909, 493	77, 065	3, 979, 832
1925	353, 696	1, 549, 120	78, 633	4, 134, 455
1926	281, 644	1, 187, 497	87, 770	4, 741, 260

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[1] Helen M. Gaylord, of the Bureau of Mines, assisted in the preparation of this report. Figures on imports and exports were compiled from records of the Bureau of Foreign and Domestic Commerce by J. A. Dorsey, of the Bureau of Mines.

During 1926 bauxite was imported from British and Dutch Guiana at an average rate of 19,110 tons per month, as compared with 21,500 tons per month in 1925. Most of it was entered at Gulf ports and was used in the aluminum industry. A few cargoes of South American bauxite were shipped to north Atlantic ports and were consumed by the chemical industries. Owing to the large size, high quality, and ease of exploitation of the deposits in these countries their bauxite has replaced the domestic bauxite except that from deposits where the conditions for exploitation are exceptionally favorable.

A considerable quantity of alumina obtained several years ago as a by-product in the treatment of alunite for its potash content at Marysvale, Utah, was sold in 1926 for use in refractories.

Domestic bauxite was reported as sold to four consuming industries in 1926, as shown in the table that follows. Sales to the aluminum industry increased 40 per cent and those to the manufacturers of aluminum salts 16 per cent. Sales to makers of artificial abrasives decreased 2 per cent and to the refractory industry 12 per cent, as compared with 1925.

Domestic bauxite sold by producers to industries in the United States, 1922–1926, in long tons

Industry	1922	1923	1924	1925	1926
Aluminum	211,560	380,520	225,780	173,040	241,850
Chemical	78,540	68,870	54,870	67,420	77,960
Abrasive [1]	19,270	72,830	66,400	73,720	72,210
Refractory	230	470	440	260	230
Alumina cement	----------	----------	80	----------	----------

[1] Includes alumina used for refractories.

For a number of years it has been impossible to give separate statistics showing the output of either artificial aluminum abrasives or refractories. Some measure of the combined output of these materials made from bauxite may be had from the quantity of bauxite sold to manufacturers, as indicated in the preceding table. Figures for aluminous abrasives heretofore reported in the chapters on bauxite and aluminum and abrasives in Mineral Resources have included annually increasing quantities of aluminum oxide used as refractory material.

Value of aluminum and aluminum salts made from bauxite, 1922–1926

Year	New aluminum	Aluminum salts
1922	$13,622,000	$8,813,000
1923	28,305,000	8,987,400
1924	37,607,000	9,301,400
1925	36,430,000	13,155,790
1926	37,583,000	13,202,010

TOTAL BAUXITE PRODUCTION OF THE UNITED STATES

The first bauxite produced in the United States was obtained in 1889 from deposits in the north Georgia field, and in 1891 the first production was made from the Alabama deposits. Practically all the bauxite mined in the United States until 1899 came from these two States. In 1896 the first shipments were made from Arkansas deposits, but it was not until 1900 that their influence was felt. In 1907 bauxite from the Tennessee deposits was first shipped. The total production of bauxite recorded in Mineral Resources from 1889 to 1926, inclusive, is 6,437,644 long tons.

MARKET AND PRICES

Bauxite finds its market east of Mississippi River and is sold largely to the manufacturers of aluminum, abrasives, commercial chemicals, and refractories. In 1925 and 1926 the manufacturers of alumina cements were largely supplied by imported bauxite. High-alumina (diaspore) clays produced in Missouri are now used in the manufacture of refractories and are sold according to their alumina content; three grades containing 55, 65, and 70 per cent of alumina (Al_2O_3) are regularly handled. Information on production will be found in the Mineral Resources report on clay.

In the last few years some of the makers of refractories and of aluminum chemicals have been using increasing quantities of clay as a crude material in place of bauxite.

BAUXITE PRODUCERS IN THE UNITED STATES IN 1926

American Bauxite Co., Bauxite, Ark.
Buckholz, P. R., Chattanooga, Tenn.
Dixon Bros., Sweet Home, Ark.
Globe Bauxite Co., Joliet, Ill.
Hill, D. B., Sweet Home, Ark.
Kalbfleisch Corporation, 200 Fifth Avenue, New York, N. Y.
Republic Mining & Manufacturing Co., 1111 Harrison Building, Philadelphia, Pa.
Southern Bauxite Co., Benton, Ark.
Superior Bauxite Co., Joliet, Ill.
Warner, Porter, 335 Volunteer Life Building, Chattanooga, Tenn.
Wright, J. P., Sweet Home, Ark.

The largest consumers of bauxite in the United States are also producers, and only a small market exists for what might be called "outside bauxite." Consumers who do not own deposits contract for their supplies for considerable periods, apparently to assure an adequate supply of bauxite of the grade desired. The price of bauxite at mines or shipping points in 1926, as reported by independent producers, ranged from $6.18 to $7 a ton; the average price reported by all producers for the year was $6.16 a ton f. o. b. mines. Consumers, on the other hand, report prices that average $10.40 a ton f. o. b. plants. The price at consuming plant varies with the distance from mines, and transportation charges are a large element of cost. The highest consumer's price was $18 a ton at California plants. The average for Mississippi Valley consumers was about $13.25 and for Atlantic seaboard consumers $15.50 a ton for domestic bauxite. Seaboard plants consumed considerable foreign bauxite, which cost on the average $12.40 a ton f. o. b. consumer's plant.

CONSUMERS OF BAUXITE IN THE UNITED STATES IN 1926

Aluminum Ore Co., East St. Louis, Ill.
Atlas Portland Cement Co., 25 Broadway, New York, N. Y.
Calumet Chemical Co., Joliet, Ill.
The Carborundum Co., Niagara Falls, N. Y.
Charles Lennig & Co. (Inc.), 40 North Front Street, Philadelphia, Pa.
Como Chemical Co., Kokomo, Ind.
E. I. du Pont de Nemours & Co., Wilmington, Del.
Exolon Co., 156 Sixth Street, Cambridge, Mass.
General Abrasive Co. (Inc.), Niagara Falls, N. Y.
General Chemical Co., 40 Rector Street, New York, N. Y.
General Refractories Co., Trinity Building, New York, N. Y.
Gulf Refining Co., Frick Building Annex, Pittsburgh, Pa.
Harbison-Walker Refractories Co., Pittsburgh, Pa.
Jarecki Chemical Co., St. Bernard Station, Cincinnati, Ohio.
Kalbfleisch Corporation, 200 Fifth Avenue, New York, N. Y.
Laclede-Christy Clay Products Co., St. Louis, Mo.
Massillon Stone & Fire Brick Co., Massillon, Ohio.
Merrimac Chemical Co., 148 State Street, Boston, Mass.
Metropolitan Utilities District, Omaha, Nebr.
The Newport Co., Carrollville, Wis.
North Hudson Chemical Co. (Inc.), Albany, N. Y.
Norton Co., Worcester, Mass. (also Niagara Falls, N. Y.).
Passaic Cons. Water Co., 158 Ellison Street, Paterson, N. J.
Pennsylvania Salt Manufacturing Co., Widener Building, Philadelphia, Pa.
Sacramento Filtration Works, Sacramento, Calif.
Stauffer Chemical Co., 624 California Street, San Francisco, Calif.
Superior Chemical Co., Joliet, Ill.
Water Department of Kansas City, Kansas City, Mo.
Water Softening and Purification Works, Columbus, Ohio.
Welch Chemical Co., 8 East Long Street, Columbus, Ohio.

The price of bauxite is now regularly quoted in the Engineering and Mining Journal. Crushed bauxite was quoted at $5.50 to $8.50 a long ton until August. Quotations were then changed to read "No. 1 chemical ore, over 60 per cent Al_2O_3, less than 5 per cent SiO_2 and less than 2 per cent Fe_2O_3," and the price quoted was $8 a ton f. o. b. Georgia mines the balance of the year. Dried and pulverized bauxite was quoted at $14, and calcined bauxite at $17 to $20 a ton f. o. b. shipping point until July, after which no quotations were given. Dalmatian low-silica bauxite was quoted at $5 to $6.50 a metric ton c. i. f. Atlantic ports; Istrian, $5.50 to $7; and French red bauxite, $6 to $7.50.

Under the tariff act of 1922 crude bauxite is dutiable at the rate of $1 a ton, and alumina hydrate or refined bauxite at half a cent a pound. (See par. 6, Schedule 1, and par. 207, Schedule 2.)

BAUXITE IN THE UNITED STATES, BY STATES

The bauxite deposits of the United States are in central Arkansas, northeastern and southeastern Alabama, northwestern and west-central Georgia, northeastern Mississippi, and eastern Tennessee.

The bauxite from all localities in the United States, though it may differ in chemical composition, is on the whole similar in general appearance, with the exception of the "granitic bauxite" of the Arkansas field. The greater part of the American bauxite appears to be made up of rounded pebblelike bodies set in a fine-grained matrix, which may also consist of small rounded particles or may be as fine-grained as the finest clay. The pebble or pisolite form is so general that it is the conspicuous characteristic of American bauxite.

There is only one way to determine the value of bauxite, and that is by chemical analysis, which should show total silica, alumina, titanium oxide, iron oxide, and water. Bauxites of commercial grade should carry at least 52 per cent of alumina.

Some measure of the relative quality of dried bauxite can be had by grinding a sample in an agate mortar for half a minute (J. M. Hill test). A bauxite of good grade will be found hard to grind and will stick to the mortar with such tenacity that it will have to be scoured out; a poor bauxite or bauxitic clay will grind much more easily and will stick very little, if at all; and clay or kaolin grinds with ease and does not stick to the mortar. Similar results are found if the sample is rubbed with considerable pressure on glass; the glass will not be scratched, but the material of highest alumina content will stick the hardest.

The Southern station of the U. S. Bureau of Mines, Birmingham-Tuscaloosa, Ala., is making an investigation of the beneficiation of low-grade, high-silica and high-iron bauxites. The use of peptizers to disperse the clay material has not proved possible, as bauxite minerals are dispersed with equal ease. Roasting and magnetic separation of high-iron bauxite removes considerable of the iron, but the recovery of alumina is not very good.

Alabama.—No bauxite was produced in Alabama in 1926. At a number of scattered deposits of bauxite of chemical grade in the Eufaula district, the area between Fort Gaines and Clayton, in Henry and Barbour Counties, development work was under way in 1926 which should result in production during 1927.

Arkansas.—Eight operators in Arkansas produced 371,570 long tons of bauxite in 1926, an increase of 25 per cent as compared with the production of 1925. The deposits in Saline County contributed 89 per cent of the output of the State in 1926, as compared with 93 per cent in 1925. The producers of the State are American Bauxite Co., Dixon Bros., Globe Bauxite Co., D. B. Hill, Republic Mining & Manufacturing Co., Southern Bauxite Co., Superior Bauxite Co., and J. P. Wright.

Bauxite mined by the American Bauxite Co., in Arkansas, lies under more than 20 feet, and in some places 100 feet, of sand overburden. Since 1924 about 60 per cent of the bauxite produced has been mined by underground methods. There are over 9 miles of tunnels in the workings.

The underground mining covers an area of 160 acres, where the overburden is 100 feet deep. The main haulage tunnel, 4,000 feet long, is driven along the edge of the ore body, and drifts 20 feet wide on 50 centers are run through the body. The retreating caving system is used.

Georgia.—Three operators produced bauxite from four counties in Georgia in 1926. The total output was more than 19,500 long tons, an increase of approximately 8 per cent over the output in 1925. The largest producer was the Republic Mining & Manufacturing Co., which worked deposits near Irwinton, Wilkinson County. The Kalbfleisch Corporation operated mines in Macon County near Oglethorpe. Porter Warner, of Chattanooga, Tenn., worked mines near Kingston, Bartow County, and Summerville, Chatooga County.

Mississippi.—No shipments of bauxite were made from the deposits in northeastern Mississippi, which were discovered by J. W. Adams in 1921.

Tennessee.—The bauxite properties in the vicinity of Chattanooga were not active in 1926. The Perry mine, usually operated by the Kalbfleisch Corporation, was not worked, but a near-by deposit, the Montague mine, was worked by P. R. Buckholz, of Chattanooga, and a new mine, the Woodward, on Missionary Ridge, was opened up during 1926.

Utah.—Somewhat over 1,400 tons of by-product alumina from Marysvale, Utah, was shipped for use in the manufacture of high-grade aluminous refractories in 1926.

BAUXITE IN FOREIGN COUNTRIES

WORLD'S PRODUCTION

The following table was compiled by L. M. Jones, of the Bureau of Mines, from official sources so far as possible:

World's production of bauxite, 1921–1926, by countries, in metric tons

Country	1921	1922	1923	1924	1925	1926
Austria	2,638	4,095	2,734	------	------	(1)
British Guiana	(2)	(2)	[3] 101,957	[3] 156,800	[3] 177,808	[3] 186,810
Bulgaria	(4)	(4)	(4)	796	(4)	(4)
France	95,318	236,141	393,736	388,692	505,189	408,600
Germany	10,122	15,150	6,664	3,085	1,767	(1)
Greece	(4)	(4)	(4)	1,000	(4)	(4)
Hungary	(1)	(1)	500	192	390	(1)
India, British	6,759	4,998	6,652	23,601	10,070	(1)
Ireland, northern	2,305	5,953	3,504	5,241	5,121	(1)
Italy	49,120	66,646	98,055	140,790	195,000	85,500
Rumania	(1)	3,737	4,162	------	------	(1)
Spain	184	------	------	------	------	(1)
Surinam (Dutch Guiana)	------	18,805	15,839	63,097	86,277	44,230
United States	141,790	314,569	531,079	353,148	321,620	398,546
Yugoslavia	10,021	31,290	32,631	18,485	79,032	(1)

[1] Data not available.
[2] Early in 1921 operations at the bauxite mines were discontinued, and the mines remained closed until late in 1922. Shipments of 20,010 tons were made from stocks in 1921. No shipments were made in 1922.
[3] Exports.
[4] No information.

Africa.—The economic importance of the deposits of high-grade bauxite not far from transportation in the Gold Coast Colony, described by Kitson[2] as containing reserves of more than 26,500,000 tons, was discussed by Emory.[3] Dixey[4] has described important bauxite deposits in Nyasaland Protectorate. There are reserves of more than 20,000,000 tons of low-silica bauxite, carrying from 57 to 60 per cent alumina, which cover an area of 2 square miles to a depth of 15 to 30 feet.

The Nyasaland Tender Board[5] has offered to receive bids for an exclusive license to give a one-year option for prospecting and exclusive mineral lease on these deposits. Tenders were to be received before October 1, 1926, at Zomba. No published information has appeared up to April 17, 1927, as to whether or not any tenders were received.

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[2] Kitson, A. E., "Bauxite deposits of the Gold Coast": Min. Mag. (London), vol. 33, November, 1925, pp. 265–270.

[3] Emory, L. T., "Bauxite on the Gold Coast": Eng. and Min. Jour.-Press, vol. 121, Mar. 13, 1926, pp. 443–446.

[4] Dixey, F., "Bauxite deposits in Nyasaland": Min. Mag. (London), vol. 33, October, 1925, pp. 201–205; "Geology mineral resources of Nyasaland": Min. Mag. (London), vol. 34, April, 1926, pp. 201–212.

[5] Mining Magazine (London): Vol. 35, September, 1926, p. 130.

France.—Production of bauxite in France in 1926 was 408,600 metric tons, compared with 505,189 tons in 1925. During the first half of 1926 exports are reported [6] to have been slightly higher than in the same period of 1925. Two French and one English company are making increasing amounts of high-alumina cement. It is not expected that the French Government will restrict exportation of bauxite, though there was some talk of this step due to the greatly increased demands by the domestic makers of metal, cement, and abrasives. After October, 1925, no French bauxite was sent to the United States until late in 1926.

Pawlowski [7] in 1925 published detailed information concerning the bauxite deposits of France. He shows that the reserve of 60,000,000 tons is sufficient for 200 to 500 years and concludes that the Government should do nothing to stop bauxite mining either by restriction of mine operation or by imposing prohibitive export duties.

British Guiana.—The exportation of bauxite from British Guiana [8] in 1925 was 174,999 long tons (177,808 metric tons) of crushed and dried material, valued at $886,342, or $5.06 a long ton f. o. b. Makenzie. All but 4,976 tons (sent to England) was shipped to the United States. Exports in 1926 were 183,860 long tons (186,810 metric tons). A syndicate, known as the Combined British Aluminum Interests, examined the remaining Crown lands in the Colony for bauxite in 1925, and in 1926 the British & Colonial Bauxite Co. was organized to acquire bauxite concessions. The capital is £20,000 of £1 shares divided into £15,000 in "A" shares and £5,000 in "B" shares. None of the "A" shares, which must always be 75 per cent of the total capital, can be held by foreigners.[9]

Hungary.—Bauxite deposits at the north end of Lake Balaton in the Vertes Mountains, with estimated reserves of 30,000,000 tons,[10] were prospected in 1925. In 1926 the Bauxite Trust A. G. of Zurich was formed with a capital of 5,100,000 Swiss francs to operate bauxite mines in Hungary, Istria, and Rumania.[11]

India.—The bauxite deposits of India, known to be very large, are worked to only a small extent because of lack of local market, high freight rate to shipping points ($3 a ton), and low price paid in America, the largest market. In some Indian States only natives can get concessions to mine bauxite, and non-British are not permitted to own mineral property in India.[12]

Italy.—Bauxite was first mined in Italy 25 years ago (1902) at Lecce ne Marsi in the Abruzzi. In 1905 the Italian Aluminum Co. built a Bayer chemical plant at Bussi, and during the World War a plant was built at Villeneuve to treat French alumina. In 1921 another aluminum works was built by the Italian Aluminum Co. at Borgofranco. The production of bauxite of the various Provinces of Italy is shown in the following table: [13]

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[6] Commerce Reports, Sept. 27, 1926, p. 808.

[7] Pawlowski, Auguste, Les bauxites françaises: Jules, Charles, and Brunet, A., Paris, 1925.

[8] Mining Magazine (London): Vol. 35, October, 1926, p. 253.

[9] Mining Magazine (London): Vol. 35, December, 1926, p. 384.

[10] Commerce Reports, Mar. 16, 1925, p. 637.

[11] Jour. du four électrique, Jan. 1, 1927, p. 3 Foreign Trade Notes, No. 131, Bureau of Foreign and Domestic Commerce, Mar. 5, 1927, p. 2.

[12] Banerjea, S. B., "Manganese and bauxite in India": Eng. and Min. Jour vol. 122, Aug. 14, 1926, p. 254.

[13] Rivista del Servizio minerario, Rome, Italy.

Bauxite produced in Italy, 1920–1926, by Provinces, in metric tons

Year	Abruzzi	Campania	Istria	Total
1920	3,300	3,339	6,500	13,139
1921		3,120	46,000	49,120
1922	750	6,896	59,000	66,646
1923	3,865	2,873	91,317	98,055
1924	14,290	1,000	125,500	140,790
1925	10,500		184,500	195,000
1926	(1)	(1)	(1)	85,500

(1) Data not available.

During 1926 the Italian Government restricted exportation of bauxite to Germany from Istria,[14] but granted 25 concessions to work bauxite deposits. The largest former producers were Società Escavo ed Industria Minerali Allumino (Sumberg) and Società Anonima Miniere Trieste (Clelia). New companies given concessions were Soc. Mineraria Istriana, S. A. Italiana Bauxite, and Sindacato Minerario Italiano.[15]

Russia.—It is reported [16] that the Aluminum Co. of America has been investigating bauxite deposits in the region of Batum and that ore was discovered in the Gandjinsk district of Azerbaijan.

Surinam (*Dutch Guiana*).—In Dutch Guiana [17] a study of the Marowyne River was made and there is possibility of developing 200,000 horsepower of hydroelectric energy at falls 100 miles south of Albina. The production of bauxite in the Dutch Colony in 1925 was 86,277 metric tons and in 1926, 44,230 metric tons. It is understood that the principal producer in Dutch Guiana, the Surinam Bauxite Co. (Ltd.), completed a large crushing and drying plant late in 1926 and shipped a large quantity of crude bauxite during the year. A new company has been organized to operate at Rarac on the Surinam River.[18]

Yugoslavia.—According to the Mining Journal (London), the Adria Bauxite Co., with large reserves of bauxite carrying 55 per cent Al_2O_3, 20 per cent Fe_2O_3, and 2 per cent TiO_2 and SiO_2, produced 86,000 tons in 1925 and 160,000 tons in 1926.[19] This company shipped over 100,000 tons of bauxite to the United States in 1926, most of which was used for the manufacture of high-alumina cement.

The Jadranski Bauxite Co., in Spalato, controlled by the Aluminum Co. of America, shipped 4,000 tons of bauxite to Norfolk, Va., in 1925, but were not shipping in 1926.[19]

ALUMINUM

DOMESTIC PRODUCTION—IMPORTS AND EXPORTS

The value of the new aluminum produced in the United States in 1926, $37,583,000, was 3 per cent greater than that of 1925, and the value of the secondary aluminum, $23,868,000, was 4 per cent less than in 1925.

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[14] Mining Journal (London): Aug. 14, 1926, p. 686.

[15] Mining Journal (London): Aug. 28, 1926, p. 711.

[16] Engineering and Mining Journal: Vol. 122, Dec. 11, 1926, p. 948.

[17] Engineering and Mining Journal-Press: Vol. 121, Feb. 27, 1926, p. 381.

[18] Commerce Reports: June 7, 1926, p. 630.

[19] Mining Journal (London): Feb. 27, 1926, p. 178. Engineering and Mining Journal-Press: Vol. 121, Apr. 17, 1926, p. 644.

According to statistics collected by J. P. Dunlop, of the Bureau of Mines, secondary aluminum was recovered to the amount of 20,500 short tons as metal and 23,700 short tons as the aluminum content of casting alloys. The total recovery was 44,200 short tons.

Value of aluminum produced in, imported into, and exported from the United States, 1917–1926

Year	Domestic production		Imports [2]	Exports [3]
	Primary metal	Secondary metal [1]		
1917	$45,882,000	$16,711,800	$56,890	$14,586,467
1918	41,159,000	10,113,600	554,586	10,869,388
1919	38,558,000	12,014,600	4,568,595	3,890,326
1920	41,375,000	9,489,100	13,077,022	5,630,781
1921	10,906,000	3,775,400	8,889,791	3,108,857
1922	13,622,000	6,085,900	9,695,012	2,836,116
1923	28,305,000	10,824,600	8,742,563	3,571,539
1924	37,607,000	14,596,200	7,145,036	4,172,390
1925	36,430,000	24,816,000	10,106,767	6,057,071
1926	37,583,000	23,868,000	16,779,377	4,452,303

[1] Value of secondary aluminum based on average price at New York as given by American Metal Market.
[2] Imports for consumption include aluminum in crude form, scrap, bars, strips, rods, plates, sheets, and all manufactures of aluminum.
[3] Exports include ingots, metal and alloy, plates and sheets, and all manufactures of aluminum.

Aluminum imported for consumption in the United States, 1925–26, by classes

Class	1925		1926	
	Pounds	Value	Pounds	Value
Crude and semicrude:				
Crude form, scrap, alloy, etc	41,894,838	$9,757,771	71,277,690	$16,384,633
Plates, sheets, bars, strips, rods, coils, and blanks	101,463	47,501	112,939	36,974
Circles, disks, rectangles, and squares	877	373	1,088	298
	41,997,178	9,805,645	71,391,717	16,421,905
Manufactures:				
Tubes, moldings, castings, and other shapes	475	425	(1)	(1)
Leaf (5½ by 5½ inches)	(2)	30,660	(2)	42,530
Powder, powdered foil	65,805	33,837	72,306	34,388
Foil less than 0.006 inch thick	79,668	64,658	185,478	108,064
Table, kitchen, and hospital utensils and other similar hollow ware	255,005	126,404	204,682	96,621
All other manufactures	47,070	45,138	(3)	75,869
		301,122		357,472
Grand total		10,106,767		16,779,377

[1] Not separately classified for 1926 but included under "All other manufactures."
[2] 1925, 21,291,695 leaves; 1926, 28,520,325 leaves; equivalent in pounds not recorded.
[3] Quantity not recorded.

Exports of ingots, scrap, and alloys in 1926 decreased 93 per cent in quantity as compared with 1925, but exports of plates, sheets, bars, strips, and rods increased 56 per cent. Exports of tubes, moldings, etc., declined 44 per cent in value, and table, kitchen, and hospital utensils 16 per cent, as compared with 1925. Exports of other manufactured goods in 1926 increased 29 per cent in value.

Domestic aluminum exported from the United States, 1925–26, by classes

Class	1925		1926	
	Pounds	Value	Pounds	Value
Crude and semicrude:				
Ingots, scrap, and alloys	8,130,222	$1,835,213	586,749	$137,980
Plates, sheets, bars, strips, and rods	4,511,812	1,530,602	7,047,422	1,997,107
	12,642,034	3,365,815	7,634,171	2,135,087
Manufactures:				
Tubes, moldings, castings, and other shapes	3,572,167	1,195,658	2,115,274	671,859
Table, kitchen, and hospital utensils	994,461	629,417	(1)	530,563
Other manufactures of aluminum	1,896,564	866,181	(1)	1,114,794
	6,463,192	2,691,256	(1)	2,317,216
Grand total	19,105,226	6,057,071	(1)	4,452,303

[1] Quantity not recorded for table, kitchen, and hospital utensils and other manufactures.

MARKET AND PRICES

Quotations on virgin aluminum, as given by the Engineering and Mining Journal, began the year at 28 cents a pound for the 99 per cent grade and stayed at that level until the middle of July, when a decrease to 27 to 28 cents was announced; the price was again lowered to 27 cents the 1st of September, at which level it remained throughout the rest of the year. The 98 per cent domestic grade was quoted at 27 cents a pound throughout the year. Foreign and secondary aluminum was sold at 1 to 2 cents a pound below the domestic figures for similar grades.

The Aluminum Co. of America reported that the demand for the metal held up well. Two important dams, one in the Yadkin River and one in Little Tennessee River, in North Carolina, were started, which will equalize the stream flow and so obviate such a condition as the Alco and Badin plants suffered in 1925. The growth in use of aluminum paints, both for outside and inside work, of foil, and of aluminum collapsible tubes has continued. Transportation companies have either built, or are considering building, street cars, freight cars, passenger cars, and busses, in the construction of which as much aluminum as possible and the strong aluminum alloys will be used. The automobile industry consumed approximately 40 pounds [21] of aluminum for each of the 4,174,886 cars built in 1925, and presumably a like or larger amount in the 4,259,425 cars built in 1926.[22] Anderson believes [21] that with aluminum at 20 cents a pound the automobile industry would use 300,000,000 pounds of the metal a year.

METALLURGY OF ALUMINUM

Development of several methods for producing aluminum from bauxite and other aluminous materials was further advanced during 1926. The more important of these processes are: (1) The Haglund process, in which alumina is made by direct smelting of bauxite or other aluminous material with carbon in an electric furnace to produce a by-product of ferrosilicon and an aluminum sulphide slag from which alumina can be recovered by leaching; (2) the Lederer process, which consists of heating aluminous minerals in autoclaves under pressure and refrigerating the reaction mixture to produce a very pure alumina; (3) the Blanc process, which involves the treatment of leucite by hydrochloric acid to produce alumina, potash, and silica; (4) the Pedersen process, which consists of using bauxite instead of limestone as a flux in an iron blast furnace to produce a high-alumina slag, which can be treated with sodium carbonate to yield alumina. The Japanese are experimenting with the sulphurous acid treatment of alunite and other aluminous materials.

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[21] Anderson, R. J., "Aluminum and bauxite": Mineral Industry, vol. 34, 1926, pp. 8–51.
[22] Commerce Reports: Feb. 7, 1927, p. 358.

Much work has been done on the various alloys and many papers in the reports of technical societies, research organizations, and the technical press have appeared during the year. A series of United States patents was issued to members of the staff of and assigned to the Aluminum Co. of America, which covers the preparation, use, and treatment of aluminum-silica alloys. The more important of these are: 1570893, January 26, 1926, to Douglas B. Hobbs; 1572382, February 9, 1926, to Ernest Raymond Crosby; 1572459, February 9, 1926, to Robert S. Archer; 1572487, February 9, 1926, to Zay Jefferies; 1572490, February 9, 1926, to Roderick L. Johnston; and 1572502 and 1572503, February 9, 1926, to Aladar Pacz.

Anderson[24] has given further details of the methods used in the recovery of aluminum from scrap materials of all kinds.

Corson,[25] research metallurgist of the Union Carbide & Carbon Co., has written a condensed 444-page work on the properties of aluminum and its various alloys.

FOREIGN ALUMINUM INDUSTRY

In December, 1926, announcement was made of the formation of a European aluminum cartel, composed of the principal aluminum producers, including the French, English, German, and Swiss companies, which control approximately 47 per cent of the world aluminum-producing capacity. The life of the cartel is two years and its main announced purpose is to develop markets and attempt to lower the price of the metal to increase consumption. It is noteworthy that the Aluminum Co. of America is not a party to the agreement. Considerable data concerning the cartel and the European bauxite and aluminum industries have been given by the Bureau of Foreign and Domestic Commerce in Special Circular No. 520, "Germany and the Aluminum Cartel"; No. 569, "The German Aluminum Industry"; and Commerce Reports, June 7, 1926, pages 597–598.

Canada.—The new $70,000,000 plant of the Northern Aluminum Co., subsidiary of the Aluminum Co. of America, at Chute à Caron, Quebec, began production in September, 1926,[26] and, it was thought, would produce 50,000,000 pounds before the end of the year.[27] This plant will have an ultimate capacity of 100,000 tons a year.[28] Power will be purchased from the Duke power plant on the Saguenay River, which eventually will furnish 500,000 to 600,000 horsepower.

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[24] Anderson, R. J., "Smelting secondary aluminum and aluminum alloys": Metal Industry, vol. 24, 1926, pp. 187–189.

[25] Corson, M. G., Aluminum—The Metal and Its Alloys: New York, September, 1926.

[26] Commerce Reports: Aug. 30, 1926, p. 545.

[27] Engineering and Mining Journal: Vol. 122, Oct. 9, 1926, p. 587.

[28] Journal du four électrique: 36th year, Feb. 15, 1927, pp. 36–37.

England.[29]—The English aluminum industry was more active than in 1925. Exports of aluminum ingots in 1926 were 4,109 tons, an increase of 365 tons, as compared with 1925.[30]

The British Aluminum Co. added to its alumina plant at Burntisland [31] and enlarged its two metal works in Norway, the capacity of which is 4,000 tons [32] a year. The new plant at Lochaber, being built for the British Aluminum Co., will have a capacity of 20,000 tons a year when completed.[33]

France.—Consumption of aluminum in France during the first nine months of 1926 was 9,047 metric tons of ingots and 527 tons of alloys; exports were 49,740 tons of ingots and 46,607 tons of manufactures; imports were 80,614 tons of ingots and 30,863 tons of sheet.[34]

Germany.—Germany imported [35] 5,527 metric tons of aluminum in 1926 as compared with 10,719 metric tons in 1925, largely from Austria, England, Norway, and Switzerland. Exports of aluminum from Germany in 1925 were 4,336 tons [36] and for the first seven months of 1926 were 9,000 tons.[37] The German production of aluminum during the first seven months of 1926 was 25,000 to 27,000 tons, and it was estimated that the total for the year would reach 40,000 to 45,000 tons.

Italy.—The Société de Montecatini is building a 6,000-ton aluminum plant at Venice, which will be ready for service in 1928.[38] The production of aluminum in Italy in 1926 was 1,800 tons and the estimated consumption between 8,000 and 10,000 tons.[39]

Japan.—A company now being formed in Japan, with a capital of 10,000,000 yen ($4,985,000), is to build an aluminum works with a rated annual capacity of 1,000 tons.[40]

Norway.—In May it was announced that the Norsk Aluminum Co. (Aluminum Co. of America) would develop a water power at Kinsarvik Falls to supply an aluminum plant, which would use the Pedersen furnace process for making alumina.[41] In July announcement was made that the British Aluminum Co. would develop 50,000 horsepower from Glom-Fjord Falls, and that the Aluminum Co. of America was to be given a concession to last till 1982 for the erection of a hydroelectric plant at the same place.[42]

The production of aluminum in Norway in 1925 was 21,404 tons. During the first nine months of 1926 exports of metal were 16,697 [43] tons, 45 per cent of which went to the United States and 27 per cent to England. The next largest shipments were to Germany, France, and Japan, with over 1,100 tons to each. There were five aluminum plants in operation in Norway in 1926 and two under construction,[44] as indicated in the following table:

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[29] Journal du four électrique: 34th year, Jan. 15, 1925, p. 3; 34th year, Mar. 15, 1925, p. 53; 35th year, Feb. 15, 1926, p. 35.

[30] Journal du four électrique: 36th year, Feb. 15, 1927, p. 35.

[31] Mining Journal (London): Apr. 3, 1926, p. 288.

[32] Journal du four électrique: 36th year, Feb. 15, 1927, p. 36.

[33] Journal du four électrique: 36th year, Feb. 15, 1927, pp. 36–37.

[34] Journal du four électrique: 35th year, Dec. 1, 1926, p. 258.

[35] Engineering and Mining Journal: Vol. 123, Feb. 26, 1927, p. 388.

[36] Commerce Reports: June 7, 1926, p. 598.

[37] Mining Journal (London): Sept. 18, 1926, p. 771.

[38] Commerce Reports: Feb. 14, 1927, p. 394.

[39] Journal du four électrique: 36th year, Feb. 15, 1927, p. 35.

[40] Commerce Reports: Apr. 11, 1927, p. 115.

[41] Mining Journal (London): May 29, 1926, p. 440.

[42] Mining Journal (London): July 10, 1926, p. 579; July 24, 1926, p. 627.

[43] Journal du four électrique: 35th year, Dec. 1, 1926, p. 259.

Aluminum works in Norway in 1926

	Horsepower	Yearly aluminum capacity
		Metric tons
Operating plants:		
Eydenhaven (built 1913)	25,000	5,000
Hoevang [1]	30,000	7,000
Stangfjord (built 1906–1908)	5,000	1,000
Tyssedal	45,000	10,000
Vigeland	12,000	2,800
Plants under construction:		
Hangvik Smeltverk	50,000	10,000
Kinsarvik	50,000	10,000

[1] Recently built, capacity will shortly be increased to 11,000 tons.

Russia.—The Supreme Economic Council is considering installing a small aluminum plant to make 3 tons of metal a day, using bauxite from the Tikhvinski deposits.[45] The electric power for this project will be developed at the Kondostroi plant on the west bank of Lake Onega in Carelia.[46]

Spain.—The new Madrid company, capitalized at 4,000,000 pesetas,[47] announcement of which was made in 1925, was floated in 1926 as the Sociedad Alumino Español. The backers are Sociedad Energia y Industrias Aragonesas, a Spanish banking group, and French, Swiss, and American capital. Power will be developed at Gallego Falls, and aluminum works and electrode plant will be at Sabifianigo in Huesca Province. The Spanish consumption of aluminum is estimated at 1,200 tons a year, and the new plant will supply all of this and have some for export.[48]

Switzerland.—The Swiss aluminum industry in 1925 suffered because of the low water and lack of electric power. The exports of aluminum were 17,775 tons, an increase of 1,700 tons as compared with 1924. The larger buyers were the United States (3,900 tons), England (2,536 tons), Italy (2,338 tons), Germany (1,641 tons), France (1,315 tons), and Japan (1,054 tons).[49]

A Swiss wall-paper manufacturer is reported [50] to have perfected a process for making an embossed paper by backing a very thin sheet of aluminum with stiff paper and stamping the pattern.

ALUMINUM SALTS

Manufacturers of aluminum salts reported a consumption of 114,570 long tons of bauxite in 1926, having an average value of $11.08 a ton at the plant, as compared with 122,340 tons in 1925, with an average value of $12.50 a ton. Of the bauxite consumed in 1926, 74,600 tons was domestic bauxite, valued at $775,780, and

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[44] Mining Journal (London): Vol. 156, Feb. 19, 1927, p. 176.
[45] Journal du four électrique: 36th year, Feb. 16, 1927, p. 35.
[46] Mining Journal (London): Sept. 18, 1926, p. 770.
[47] Journal du four électrique: 34th year, Oct. 15, 1925, p. 199.
[48] Mining Journal (London): Aug. 21, 1926, p. 705.
[49] Mining Journal (London): Sept. 11, 1926, p. 744.
[50] Commerce Reports, May 31, 1926, p. 555.

39,970 tons was imported bauxite, valued at $494,160. An unrecorded quantity of high-alumina clay, 3,794 tons of alumina hydrate, and 191 tons of alumina were also used in the preparation of aluminum salts. These figures do not include the bauxite made into alumina as a preliminary step in the manufacture of aluminum.

Aluminum salts produced in the United States, 1925–26

Salt	1925				1926			
	Number of producers reporting	Short tons	Value		Number of producers reporting	Short tons	Value	
			Total	Average			Total	Average
Alum:								
Ammonia	5	4,750	$308,750	$65	5	4,560	$276,480	$61
Sodium	4	14,450	838,100	58	6	16,740	953,840	57
Alumina, calcined and hydrate	4	4,490	321,850	72	3	3,910	287,660	74
Aluminum chloride	4	12,830	4,012,920	313	5	16,750	3,562,690	213
Aluminum sulphate:								
Commercial—								
General	14	276,210	6,905,250	25	14	307,550	7,374,940	24
Municipal	6	6,240	129,600	-------	5	7,130	134,590	19
Iron-free	7	16,140	613,320	38	7	16,160	557,460	34
Other aluminum salts	-------	370	26,000	-------	-------	895	54,350	-------
	-------	335,480	13,155,790	-------	-------	373,695	13,202,010	35

Aluminum salts produced in, imported into, and exported from the United States, 1922–1926

Year	Domestic production		Imports		Exports (aluminum sulphate)	
	Short tons	Value	Short tons	Value	Short tons	Value
1922	281,480	$8,812,987	2,889	$116,971	13,225	$388,447
1923	289,904	8,987,421	2,318	120,663	17,805	505,732
1924	302,190	9,301,410	2,523	113,075	16,012	407,749
1925	335,480	13,155,790	3,205	140,518	20,756	505,537
1926	373,695	13,202,010	2,937	140,994	22,031	521,123

ALUMINOUS ABRASIVES AND REFRACTORIES

The use of high-alumina refractories continues to grow. Expansion is shown by the increasing demand for high-alumina clays and other aluminous minerals by ceramists all over the country. In 1926 the makers of refractory brick took 230 long tons of bauxite and 18,483 short tons of high-alumina (diaspore) clay. Andalusite and dumortierite, the newly applied aluminous raw materials, were shipped from deposits in California and Nevada in increasing amounts during 1926. Alumina by-product in excess of 1,000 tons was shipped from Marysvale, Utah, to California and New Jersey makers of refractories.

ALUMINA CEMENTS

Although no domestic bauxite was reported by producers as sold to makers of high-alumina cement, it is known that a large quantity of foreign bauxite, mostly Dalmatian, was consumed by this industry. The use has expanded and many engineering data have been accumulated, all tending to prove the value of this cement for certain uses and where time and cost are important elements.

Bates [51] has very well discussed the high-alumina cements. He points out the necessity for great care in the handling of this material, and also that, in his opinion, the cement is too young to have proved itself, as cement must, by long-time tests in actual construction uses.

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[51] Bates, P. H., "High-alumina hydraulic cements": Ind. and Eng. Chem., vol. 18, June, 1926, pp. 554–559.

ANTIMONY

By J. W. FURNESS[1]

INTRODUCTION

The wide differences in the cost of the production of antimony in various parts of the world bring out clearly the necessity of basing any compilation of the available reserves of mineral deposits upon the factor of cost. It might be said that, at a world's price of 6 cents a pound, China possessed the only available reserves of antimony. This statement emphasizes the fact that a country may have relatively large quantities of a certain metal available to the world at a price higher than the current world price. The known resources of antimony in the United States are relatively meager and would become commercial only at an extremely high price. From 1908 to 1914, inclusive, there was no domestic production from antimony ores. During the World War period, 1915 to 1918, inclusive, the domestic antimony ores mined contained 4,310 short tons of metallic antimony. From 1919 to 1921, inclusive, there was no domestic production of ores, and in the period 1922 to 1926 the production was 395 tons of ore containing 123 tons of antimony.

Antimony is a relatively cheap, common metal for which there is a small demand in comparison with that for other common metals. Except during periods of political upheaval the world demand has been easily satisfied from the now developed sources.

The comparatively restricted uses of antimony in times of peace limit consumption, but military demands in war greatly increase use and have resulted in overproduction and fluctuations of price between wide limits. The normal peace-time consumption by the world is about 20,000 tons per annum. At certain periods—for example, 1880 to 1881, 1890 to 1891, 1906 to 1907, and 1915 to 1916—the demand was greatly augmented because the European Governments purchased antimony for munitions. In 1916 the world's consumption reached a peak of about 78,000 tons.

The price of antimony is never stable; many factors contribute to this condition. The factors listed help to influence the price: Speculation by Chinese merchants and aliens; uncertainty of demand, which is influenced by the price fluctuations of the metals for which antimony is a substitute; the ease with which China's production may be increased or diminished; and the range of prices at which antimony may be produced in China. The low cost of production in China has throttled production from virtually all other sources;

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[1] Figures on domestic production compiled by A. Stoll, those on imports and exports by J. A. Dorsey, from records of the Bureau of Foreign and Domestic Commerce, and those on world's production by L. M. Jones, all of the Bureau of Mines.

indeed, other countries are justified in producing only when the Chinese attempt to restrict the output in order to raise the price, a condition that makes the mining of the metal in other countries a most insecure undertaking. The Chinese monetary system, based as it is upon silver, influences the price of antimony because fluctuations in the price of silver immediately change the price of antimony. This condition is readily explained when the fact is known that Chinese antimony is ordinarily sold c. i. f. foreign ports. In other words, the cost of 1 ton of antimony in China, measured in ounces of silver, remains relatively constant. The moment the antimony leaves the country the freight and insurance are based upon a gold standard, therefore the price at which silver is selling determines the c. i. f. price of antimony. Another factor is the seemingly short-sighted policy of the consumer in supplying his needs by hand-to-mouth purchases and thus creating an uncertain demand. The history of the consumption of antimony does not reveal long periods of relatively uniform consumption but tends to show that the industry is ever in the joys of a feast or the throes of a famine.

The production of antimony by various countries illustrates the necessity of grading resources on the basis of price. The reserves of China may be in part gauged by the fact that exports have been made when the world's price of antimony was below 5 cents a pound. China dominates the world's antimony production, and such sources as Bolivia and Mexico are world's resources only at price. To establish or maintain a domestic antimony-mining industry in the United States would require the guarantee of sale at a price which would be extremely high in comparison with the prices at which antimony could be sold from other sources and would probably curtail consumption. Antimony finds its principal uses as a cheap substitute for more expensive metals, and if the price were raised to the level of those metals, justification of its use would be lacking. As to the smelting of foreign ores in the United States, it might be conceded that the efficiency of labor, mechanical devices, and metallurgical knowledge would offset other favorable factors in the countries where the mineral is produced. Such advantages as the United States may have are probably more than offset by transportation costs on crude ore or liquated antimony as compared with the transportation cost on regulus. From time to time the smelting of foreign ores to produce metallic antimony has been attempted, but the plant of the Krauss Chemical Co. of New Brunswick, N. J., which operated the last three months of 1926 and produced some metallic antimony and antimony salts from foreign ores, was the only one in operation in this country in 1926. The Chapman Smelting Co. of San Francisco at one time made a small output of metallic antimony from both domestic and foreign ore but found operation on a commercial basis impossible, and closed its plant. The Selby plant of the American Smelting & Refining Co., in California, in 1926 produced some antimony alloys and salts as a by-product recovered from ores of other metals. No antimony ores were purchased by the company. The Hoyt Metal Co., Granite City, Ill., smelted some antimony ore from Mexico with slags, drosses, etc., to increase the antimony content of the alloys manufactured but did not produce metallic antimony.

Monthly prices of ordinary brands of antimony at New York in 1926, in cents per pound [1]

Month	Maximum	Minimum	Average	Month	Maximum	Minimum	Average
January	25.00	22.00	23.38	August	16.75	15.00	15.93
February	22.00	21.00	21.67	September	16.50	14.00	15.36
March	20.75	18.00	19.36	October	14.50	13.37½	13.98
April	18.25	13.25	17.11	November	14.00	12.75	13.27
May	13.00	9.50	11.60	December	14.00	12.50	13.21
June	14.00	10.00	11.58				
July	16.00	13.25	14.46	The year	25.00	9.50	15.91

[1] Metal Statistics, 1927, American Metal Market.

PRODUCTION

The world's shipments of regulus for 1926 were, in round numbers, 29,000 short tons. The total imports of metallic antimony and liquated antimony sulphide into the United States were 14,711 short tons. The domestic production was 99 tons of crude ore, containing 43 tons of metallic antimony. The production of antimonial lead from ores of domestic origin was 18,909 tons, with an antimony content of 2,289 tons. In addition to the imports of metallic antimony and antimony sulphide mentioned, 4,310 tons of type metal and antimonial lead containing 783 tons of metallic antimony, 2,259 tons of antimony oxides and other compounds, and 2,497 tons of antimony ore containing 1,559 tons of antimony were imported for consumption.

Mine production of antimony ores in the United States, 1917–1926, in short tons

Year	Ore	Antimony content	Year	Ore	Antimony content
1917	1,060	390	1923	40	10
1918	190	50	1924	113	33
1919–1921	----------	----------	1925	123	33
1922	20	4	1926	99	43

SMELTER PRODUCTION OF ANTIMONIAL LEAD

By-product antimonial lead produced in the United States from both foreign and domestic ores, 1917–1926

Year	Short tons	Antimony content		Year	Short tons	Antimony content	
		Short tons	Value [1]			Short tons	Value [1]
1917	18,646	2,759	$1,142,000	1922	8,075	1,441	$156,000
1918	18,570	2,566	647,000	1923	14,190	2,170	338,500
1919	13,874	1,943	319,000	1924	20,787	2,763	596,800
1920	12,535	2,033	345,000	1925	19,667	2,624	918,400
1921	10,064	1,589	158,000	1926	22,524	2,693	856,400

[1] Calculated at average yearly price for ordinary brands of antimony as given by American Metal Market.

RECOVERY OF SECONDARY ANTIMONY

During 1926 (according to J. P. Dunlop) the recovery of antimony from old alloys, scrap, and dross was 16,230 short tons. Of this total, 13,320 tons was recovered in the form of alloys and 2,910 tons as metallic antimony; 2,550 tons was recovered from antimonial lead scrap treated at regular smelters and 13,680 tons was recovered as metal and in alloys at secondary smelters.

Secondary antimony and antimony content of secondary alloys recovered from old alloys, scrap, and dross in the United States, 1917–1926

Year	Short tons	Value [1]	Year	Short tons	Value [1]
1917	4,961	$2,061,700	1922	7,090	$765,700
1918	5,226	1,317,000	1923	8,021	1,252,800
1919	4,399	717,900	1924	9,404	2,025,600
1920	5,600	938,560	1925	10,840	3,794,000
1921	4,720	464,400	1926	16,230	5,164,400

[1] Values calculated at average yearly price for ordinary brands of antimony as published by the American Metal Market.

IMPORTS AND EXPORTS

Antimony imported for consumption in the United States, 1917–1926

Year	Antimony ore [1]			Liquated antimony sulphide [2]		Metallic antimony [3]		Antimony oxides and other compounds [4]	
	Short tons	Antimony content		Short tons	Value	Short tons	Value	Short tons	Value
		Short tons	Value						
1917	10,083	5,832	$1,006,884	796	$128,660	11,286	$2,829,159	10	$5,368
1918	3,363	1,425	177,731	833	113,258	14,011	3,065,619	18	11,904
1919	993	409	54,477	278	19,202	7,159	1,021,587	126	9,501
1920	1,709	682	70,285	1,375	123,902	9,817	1,216,376	298	25,260
1921	213	98	11,682	353	17,577	10,130	784,146	154	15,558
1922	------	------	------	689	40,108	9,344	659,242	379	65,538
1923	(5)	1,047	44,721	835	64,493	6,763	641,804	2,277	288,206
1924	(5)	899	62,999	558	52,393	6,778	840,434	1,207	190,252
1925	1,359	773	47,084	760	115,990	9,857	2,362,915	1,792	349,990
1926	2,497	1,559	287,258	2,040	343,705	11,506	3,144,330	2,259	517,584

[1] Classified in tariff classification as "Antimony ore and stibnite containing antimony."

[2] Classified in tariff classification as "Antimony matte containing not more than 10 per cent of lead," also as "needle or liquated antimony."

[3] Classified in tariff classification as "Antimony regulus or metal."

[4] Classified in tariff classification as "Antimony, oxide, salts, and compounds of."

[5] Figures not available.

Antimony imported into the United States, 1925–26 [1]

[General imports]

Country	Antimony ore			Antimony metal [2]	
	Gross weight (short tons)	Antimony content			
		Short tons	Value	Short tons	Value
1925					
Africa—British South	29	3	$214		
Belgium				87	$16,972
Bolivia [3]	399	240	20,369		
Canada	29	6	250	4	960
Chile [3]	179	108	7,912		
China [4]				7,428	1,656,788
France				201	54,377
Germany				1,178	333,779
Hong Kong [4]				583	121,733
Italy				57	13,769
Japan [4]				28	5,963
Mexico	723	416	18,339	99	13,271
Straits Settlement				28	6,994
United Kingdom				966	288,814
	1,359	773	47,084	10,659	2,513,420
1926					
Africa—Belgian Congo	27	14	2,366		
Argentina	138	115	9,185		
Belgium				98	25,152
Bolivia [3]	218	130	20,996		
Brazil	26	16	2,111		
Canada	71	34	3,250	(5)	40
Ceylon				28	4,900
Chile [3]	847	528	70,919		
China [4]				11,432	2,903,294
France				398	93,669
Germany				1,671	441,329
Hong Kong [4]				56	14,856
Italy				17	307
Japan (including Chosen) [4]				64	20,921
Kwantung				56	16,137
Mexico	1,222	751	181,438	66	14,806
Netherlands				196	40,320
United Kingdom	[6] 2	2	593	629	219,361
	2,551	1,590	290,858	14,711	3,795,092

[1] Includes large quantities of antimony metal that went into bonded warehouse and that are not included in the table of imports for consumption.

[2] Includes small quantities of liquated antimony sulphide, known in the trade as "crude antimony," "antimony matte," or "needle antimony."

[3] Imports credited to Chile originated mainly in Bolivia.

[4] Nearly all the imports of antimony ore and metal from Hong Kong and Japan are of Chinese origin. Some of the material credited to other countries is possibly also of Chinese origin, having been transshipped in a foreign port.

[5] 224 pounds.

[6] As recorded by Bureau of Foreign and Domestic Commerce; probably metal.

Type metal [1] *imported for consumption in the United States, 1917–1926*

Year	Type metal		Assumed antimony content		Year	Type metal		Assumed antimony content	
	Short tons	Value	Short tons	Percentage		Short tons	Value	Short tons	Percentage
1917					1922	22,448	$1,120,814	5,476	24.4
1918	276	$35,938	19	7.0	1923	[2] 3,677	[2] 431,610	(3)	(3)
1919	6,697	816,642	1,197	17.9	1924	[2] 644	[2] 100,367	(3)	(3)
1920	14,944	1,349,495	2,063	13.8	1925 [1]	3,005	463,134	850	28.3
1921	19,485	1,191,553	4,132	21.2	1926 [1]	4,311	912,331	784	18.2

[1] Classification for 1925 and 1926 is "Type metal and antimonial lead"; separate figures not recorded.

[2] Lead content only. Figures for gross weight for 1923 and 1924 not available.

[3] Data not available.

Foreign antimony (matte, regulus, or metal) exported from the United States, 1917–1926 [1]

Year	Short tons	Value	Year	Short tons	Value
1917	495	$169,260	1922	19	$1,548
1918	705	164,666	1923	8	1,047
1919 [2]	215	33,913	1924	140	14,441
1920	448	51,607	1925	94	17,376
1921	150	15,741	1926	184	41,554

[1] During 1922 there was also exported, mainly to Canada, 112 tons of regulus or metal of domestic manufacture, valued at $13,961. This is the first export of domestic antimony of which there is any record. However, antimony manufactured in the United States from foreign ores and exported would also be classed as domestic exports. Similar exports for 1923–1926 are not shown.

[2] Also 3 short tons of antimony ore, containing 5,380 pounds of antimony, valued at $1,665, was exported in 1919.

CONSUMPTION

The following table shows the approximate percentage of world's consumption and production of antimony by various countries under normal conditions and represents the approximate average of the five-year period, 1921–1925. It clearly illustrates the dependence of consuming countries upon China for their needs of this metal.

Approximate average percentage of world's consumption and production of antimony in five-year period, 1921–1925, by countries

Country	Percentage of consumption	Percentage of production
Algeria		3.66
Asia Minor		2.06
Australia (Victoria and New South Wales)	Small.	1.46
Austria and Hungary	0.4	.21
Bolivia		2.87
China	[1]	76.66
France	5.4	4.61
Germany	10	Small.
Italy	1.5	1.21
Japan	.5	.01
Mexico		3.27
United Kingdom	26	
United States	45	.06
	88.8	96.08

[1] It is estimated that the consumption of antimony in China is approximately 2,500 tons of regulus per annum. As the percentage of production is based upon exports, the figure as to consumption does not appear in the table.

The decline in the price of antimony from an average of 23.38 cents in January, 1926, to 9½ cents on May 26 and May 27 and the fact that the closing price of the year was 13 cents may be attributed in the main to the decreased demand of automobile manufacturers and to the introduction of a substitute for storage batteries in radio sets. The storage-battery trade is one of the largest consumers of antimony. Very little of the metal so used is lost, however, and the demand is being supplied largely by metal recovered from reclaimed batteries; the need for virgin antimony is thus decreased. Antimony used in rubber, glass, enamel, paints, and the ceramic industries is, after a comparatively short service, not available for reclamation. It has been estimated that 90 per cent of the antimony used for battery purposes is recovered, and with a comparatively small loss virtually all of the antimony in type metal eventually comes back for resmelting and refining. During the past few years part of the increased consumption of antimony may be attributed to the high price of mercury. Antimony has been substituted for mercury in coloring rubber and pigments; it has also been used for tin in cable sheathings, because of the high prices of this metal.

In the pigment industry organic pigments are rapidly replacing inorganic minerals. The estimates in the following table have been made by the author to show the relative consumption of antimony by uses:

Estimated percentage of consumption of antimony in the United States in 1926, by uses

	Percentage
Babbitt metal	26
Battery plates	14
Soft-metal alloys and solder	12
Hard lead, including pipe, traps, etc	10
Type and type metal (linotype, electrotype, stereotype)	8
Vulcanized rubber and rubber goods	7
Bearing or antifriction metals not elsewhere specified	6. 5
Enamel on metal ware	4
Cable coverings	3
Chemicals, paints, and pigments	2. 5
Brass, including bronze	. 8
Shrapnel and other bullets	. 5
White metal and alloys, foil, collapsible tubes, britannia metal, caskets, carriage and other hardware and lighting fixtures, primers for explosives, and miscellaneous uses	5. 7
	100

WORLD SOURCES

World's production of antimony, 1918–1926, in metric tons

[Approximate recoverable metal content of ore produced, exclusive of antimonial lead ores]

Country	1918	1919	1920	1921	1922	1923	1924	1925	1926
North America:									
Canada	[1] 7	[1] 14	--------	--------	--------	--------	--------	--------	--------
Mexico	3, 279	471	623	45	464	490	775	1, 398	2, 614
United States	45	--------	--------	--------	4	8	24	24	31
South America:									
Argentina	[2] 360	[2] 27	[2] 50	--------	[1] 1	[1] 5	[2] 120	[1] 10	(3)
Bolivia [1]	3, 010	105	484	282	185	312	621	1, 384	3, 260
Peru	[1] 155	[1] 30	[1] 7	--------	--------	--------	--------	8	47
Europe:									
Austria	--------	1	--------	--------	139	62	1	--------	87
Czechoslovakia	(3)	153	330	384	100	453	1, 066	(3)	(3)
France	1, 329	998	1, 130	1, 276	834	691	1, 021	648	580
Germany (Bavaria)	--------	--------	--------	2	4	(3)	(3)	(3)	--------
Greece	--------	55	46	--------	--------	--------	--------	(3)	(3)
Hungary	(3)	66	93	--------	--------	--------	--------	--------	(3)
Italy	404	10	187	76	146	271	372	312	(3)
Portugal	--------	--------	--------	--------	--------	8	14	15	(3)
Spain	22	--------	--------	--------	--------	25	--------	--------	14
Yugoslavia	(3)	(3)	(3)	(3)	(3)	131	414	139	182
Asia:									
China [1]	15, 597	7, 721	13, 001	14, 658	13, 858	14, 256	12, 059	19, 496	20, 028
India, British	--------	2	(4)	1	--------	--------	--------	5	(3)
Japan	95	1	--------	--------	--------	--------	10	--------	(3)
Turkey (Asia Minor) [5]	400	400	400	400	400	400	400	400	400
Africa:									
Algeria [1]	2, 218	723	1, 000	103	579	500	905	1, 461	334
Nigeria [1]	--------	(6)	(6)	(6)	(6)	(6)	--------	--------	(3)
Rhodesia, Southern	3	--------	2	--------	--------	--------	--------	5	7
Union of South Africa	38	10	--------	--------	--------	--------	--------	--------	(3)
Oceania:									
Australia—									
New South Wales	143	70	81	50	--------	--------	--------	12	(3)
Queensland	--------	--------	--------	--------	--------	--------	--------	--------	3
Victoria	509	491	406	141	605	421	130	54	--------
Western Australia [1]	--------	--------	(7)	--------	--------	--------	--------	--------	(7)

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[1] Exports.

[2] Railway shipments. A large part of the shipments reported is probably of Bolivian origin and therefore may duplicate in part the quantities shown for Bolivia.

[3] Data not available.

[4] Estimated recovery from ore produced, 2 kilograms.

[5] Estimated.

[6] Less than 1 ton. The estimated recoverable metal content of ores exported was as follows: 1919, 169 kilograms; 1920, 178 kilograms; 1921, 74 kilograms; 1922, 190 kilograms; 1923, figures not given.

[7] Less than 1 ton. Estimated recoverable metal content of ores exported was as follows: 1920, 278 kilograms; 1926, 464 kilograms.

The producing countries of the world may be divided into three groups: (1) China, Bolivia, Mexico, Algeria, and Czechoslovakia; (2) France, Australia (Victoria), Burma (India), South Africa, Italy, and Spain; (3) countries in which the known deposits are of minor importance, such as Canada, Peru, Germany, Turkey, Siberia, Portugal, Borneo, Indo-China, Japan, and the United States, including Alaska.

According to present knowledge the major world resources of antimony are in China, Bolivia, and Mexico.

CHINA

All the Chinese Provinces south of the Yangtze have antimony deposits, but all other deposits are insignificant in comparison with those of Hunan. Outside of Hunan, the largest deposits are in Yunnan, Kwantung, Kweichow, Kwangsi, and Szechuan, in which provinces the mines are worked on a very small scale and only when prices are extremely high. Hunan exports virtually all of the antimony shipped from China. The deposits are the largest now known in the world. About 90 per cent of the total production of China comes from the region about Changsha, the capital of the province and the center of the smelting industry. Of the seven or more productive fields in Hunan the most important is Kai-kong-shan, a field about 3½ miles long and 2 miles wide. Tegengren[2] estimates the total reserve in the northern part of the field, embracing a hill called Hsi-K'wang-shan, as 1,400,000 tons of metallic antimony. This mineralized area constitutes the largest known antimony deposit and is the largest producer in the world. The country rock is quartzitic sandstone and as a whole is estimated to contain about 6 per cent of antimony; when hand picked the ore carries about 60 per cent of metallic antimony.

John C. Vincent, vice consul, Changsha, Hunan, China, in a report dated April 2, 1926, states:

> *Mining.*—The number of antimony mines and mining companies in Hunan is variously estimated at from two to three hundred. Some are active; some are not. A rise in the price of antimony usually brings some of the inactive ones into action; a fall in the price produces the opposite result. Mining concessions and permits are obtained from the Hunan Government. Practically all of the mines are owned by private companies or individuals. Except for the granting of permits, the Government exercises very little control over the production of antimony. The only form of interference comes in the way of taxes. According to the Chinese mining regulations, no foreign company or individual can own a controlling interest in a mining company. These regulations are adhered to in Hunan, but it is a matter of common knowledge that some of the foreign companies doing business in the Province exercise control of Chinese mining companies. This system, however, is the exception rather than the rule, and its practice is likely to involve the foreigner in difficulties. In a vast majority of cases the foreign company will profit by refusing to become entangled in any way whatsoever in Chinese mining enterprises. By foregoing the temptation to invest, directly or indirectly, in mines and mining companies and limiting itself to a strictly buying business, the foreign company avoids inevitable difficulties and possible losses and does not hurt its chances of trading on an equal footing with other companies. Supplies are always to be had, and trading is free enough to allow competitive prices to prevail most of the time.

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[2] Tegengren, F. R., The Hsi-K'wang-Shan Antimony Mining Fields, Hsin-Hua District, Hunan: China Geol. Survey Bull. 3-4, pp. 1-21.

Owing to the fact that most of the antimony deposits occur near the surface, only the most rudimentary machinery is used in mining. Operations are conducted after a primitive Chinese fashion, without any attempt at systemization. Galleries are driven in all directions. Only the richer ores are extracted. The poorer grade ores and those which are located at a considerable depth are left for future working. The only kind of modern machinery used are boiler feed pumps for clearing water from the galleries. Crude picks, shovels, etc., comprise the remainder of the equipment. The amount of capital investment in mines, other than the actual value of the mining property, is very small. Smelting also is done by Chinese companies.

During the war much of the smelting was done in Changsha, the ores being shipped from the mines for this purpose. Under present conditions, however, the smelters are located at the mines and buy ores directly from the mining companies. The smelters are small affairs, using little machinery and operating on very close margins. As in the case of the mining companies, an increase in the demand for antimony will bring the dormant ones into action. The smelting companies sell either to brokers at the mines (the prevailing custom) or to Changsha brokers.

Transportation.—With antimony, as with other bulky commodities, the cost of transportation figures largely in the value of the product. Convenience of transportation is one of the primary considerations of the company doing a mining business at a distance from the market. Water transportation, being cheap, is of great importance, and in central Hunan, where the only other means of carrying freight is by coolies, it is well-nigh indispensable to the mineral trade.

The antimony mines are fortunately situated in this respect. The Tse Kiang and the Lien Shui, both rivers flowing into the Siang River upon which Changsha is located, the latter at Siangten and the former at Siangyin, pass through the antimony district and within close proximity to the Sikwangshan mines. Shipments are made to Changsha by native junks propelled by sails, oars, and towers. Boats are able to ply these rivers the year around, except in periods of very low water such as occurred last summer and fall during the drouth. The Lien Shui offers the shortest route to Changsha, but, due to bandit troubles in the territory through which this river passes, most of the cargo is routed by the Tse Kiang at present.

Cost of production.—Under the most favorable conditions the cost of delivering 1 ton of antimony regulus originating at Sikwangshan is estimated at $240 Mexican (about $120 gold). A combination of unfavorable conditions will raise this figure as high as $450 Mexican. The factors which cause this wide divergence of estimates are richness and accessibility of ores, difficulties in smelting, and nearness of waterways. The costs of mining, smelting, and shipping are the three determinants of the cost of antimony regulus in Changsha.

The cost of mining ranges from $130 Mexican to $260 Mexican. When the price of antimony is low, less than 8 cents gold in New York, the mines with high-production costs can not operate. As stated above, the cost of mining equipment is very low. Miners receive from 50 to 75 cents Chinese a day and men employed in carrying and picking ores a trifle less.

The cost of smelting varies from $70 to $100 Mexican. The simple manner in which smelting is done does not require the assistance of experts. The smelters themselves are small and represent only a small capital investment.

During high-water seasons, when boats can go within a few miles of Sikwangshan mines, the cost of bringing antimony to Changsha is as low as $30 Mexican a ton. When the water is low, the number of boats which are able to operate is reduced and the distance of overland carrying is increased, thus raising the cost of transportation as high as $80 a ton. When the cost mounts to this figure, little antimony is forthcoming. There are times, notably last summer and fall, when shipments cease entirely because of low water.

In addition to these three items of expense, there is an assessment made by the provincial government in the form of a transit or likin tax. Although it is not a set ad valorem tax, it is figured on the basis of the prevailing price of antimony and generally amounts to about 4 per cent of the value of the shipment. A receipt, known as a likin pass, is issued to the shipper, which exempts him from any further taxation on the goods while it is in transit from the mine to Changsha. Although it is understood that a goodly number of the mining concessions have fallen into the hands of military officials, these men do not interfere with the trade nor enter into it in any other way than as sellers.

Antimony exported from China and quotations on Chinese antimony at New York, 1917–1926

Year	Exchange rate, Hong Kong (taels)	Exports (metric tons)[1]	Quotation c. i. f. New York in cents per pound		
			High	Low	Average
1917	1.03	28,450	34.66	13.90	20.73
1918	1.26	15,597	14.23	8.19	12.55
1919	1.39	7,721	9.56	6.83	8.16
1920	1.24	13,001	11.55	5.00	8.38
1921	.76	14,658	5.25	4.51	4.92
1922	.83	13,858	6.81	4.13	5.42
1923	.7975	14,256	9.18	7.20	7.81
1924	.89	12,059	14.98	8.39	10.77
1925	.7577	19,496	[2] 24.50	[2] 11.00	[2] 17.50
1926	.69	20,028	[2] 25.00	[2] 9.50	[2] 15.91

[1] Maritime Customs, Foreign Trade of China.

[2] American Metal Market.

BOLIVIA

Little authentic information can be obtained as to the extent of the antimony deposits of Bolivia. No estimates have been made of the antimony reserves in tons. It is known, however, that antimony occurs in many places near tin mines. The war-time production came from scattered deposits mined by the native population during the period of high prices. In 1914 Bolivia exported 82 metric tons of antimony (recoverable metal content of ore); in 1916, 12,060 tons; in 1917, 10,288 tons; and in 1926, 3,260 tons. The chief producing centers are the Chuquitu district in the vicinity of Uncia and in the country surrounding Porco. The reserves of low-grade material are known to be of considerable extent.

The sporadic production of antimony in Bolivia may be in part attributed to the fact that producers, in order to be secured against market fluctuations, make contracts only during periods of stable prices. The uncertainty of price does not tend to stabilize production. It has been stated that "Bolivia may very well one day replace China as a leading producer of this metal." [3]

MEXICO

Antimony deposits occur in the Altar and Hermosillo districts, Sonora, and in the Sierra de Catorce and Charcas, San Luis Potosi. The area in which antimony is found lies in a strip about 14 miles long between Charcas and Catorce. The ore is found in porphyry and runs from 5 to 55 per cent of metal. The output up to 1912 was approximately 4,000 tons of crude ore per annum. Antimony is present in the silver veins of Molango, Hidalgo, and Zacualpan, State of Mexico, and in the Triumfo and San Antonio mines of Lower California.

At Wadley, in the State of San Luis Potosi, a smelter has been operated for many years, and the product from this goes to Newcastle-on-Tyne, England, and is handled by the Cooksons.

The smelting capacity of the Wadley smelter is 6,000 tons per annum. In 1915 Americans erected a smelter with a capacity of 3,000 tons metallic antimony per annum in the State of San Luis Potosi.

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[3] Voge, Law, "Antimony in Bolivia": Eng. and Min. Jour.-Press, Apr. 24, 1926, pp. 677–679.

In 1917, at Antimonio in the Altar district, State of Sonora, several properties were opened up, and the district seems to contain a considerable reserve.

Mexico, like Bolivia, apparently has a large reserve of antimony which is produced only at comparatively high prices. As an example, according to the American Metal Market, July 15, 1926, page 11, 15 carloads of antimony ore, totaling 712 short tons, valued at $110,270 United States currency, were shipped through Nogales to the United States during the first half of 1926, as compared with 1 carload of approximately 18 short tons, valued at $1,089, for the corresponding period of 1925. The increased shipments in the spring of 1926 were unquestionably due to the high prices current during the latter part of 1925 and the first quarter of 1926, when the average price for the period under discussion (5 months) was slightly in excess of 21 cents.

The production of antimony (recoverable metal content of ore produced) in Mexico amounted to 1,398 metric tons in 1925 and to 2,614 metric tons in 1926.

TARIFF HISTORY

Antimony ore has been imported free of duty in the United States since 1870, except that under the act of 1909 its antimony content was dutiable at 1 cent per pound.

Antimony regulus or metal paid an import duty of 10 per cent ad valorem for 26 years, beginning in 1864. The act of 1890 changed the ad valorem rate to a specific duty of three-fourths of a cent per pound—a reduction. In the act of 1894 antimony was on the free list; but the act of 1897 restored the specific duty of three-fourths of a cent per pound, as in the former tariff. In the 1909 act the duty was doubled. After 23 years under specific rates (except the three years on the free list) antimony metal was again made dutiable on an ad valorem basis in 1913, returning to the early rate of 10 per cent. Except in 1916, when the average price was 25.1 cents per pound, the 10 per cent rate was operated as a reduction in the duty as compared with the 1½-cent specific rate of the 1909 act.

The tariff act which became effective September 22, 1922, placed an import duty of 2 cents per pound on antimony metal or regulus; on needle or liquated antimony, ¼-cent per pound; on oxide, 2 cents per pound; and on sulphide and on other antimony salts and compounds, not specially provided for, 1 cent per pound and 25 per cent ad valorem. No duty is placed on crude ore.

In France antimony ore and "grey" or liquated antimony ore were free until April 6, 1926. Metallic antimony (regulus) was dutiable at the rate of 24 francs per hundred kilos, maximum; the minimum rate was 6 francs per hundred kilos. On the date stated rates were increased 1.7 times the maximum and minimum rate. The minimum rate is accorded the United States.

There is a small export duty on antimony from Bolivia, but no restrictions as to imports.

TRADE IN ANTIMONY

Antimony finds its way into the United States almost entirely in five forms: Metallic antimony, liquated antimony sulphide, antimony ore, antimonial lead, and oxide of antimony. Other compounds are less important. Metallic antimony is known in the trade as "regulus" and, as has been stated, is imported in the main from China; liquated antimony sulphide, known as "crude antimony," "needle antimony," and "antimony matte," is imported in small quantities from China, and small amounts of antimony ore are imported from Bolivia, Chile, Mexico, and other countries. The fourth class of imports, antimonial lead, carries from 12 to 20 per cent antimony. Oxide of antimony is imported largely from China.

Reports of political unrest in China during the last few years have been used from time to time to influence the antimony trade. The fact that transportation might be interfered with has greatly aided speculators in antimony. The fact is that the flow of antimony has been virtually uninterrupted, and price has been the governing factor of production. For many years the Chinese have attempted, by forming cartels, to control the exports of antimony. These attempts have invariably resulted in bringing out latent production which in the course of a very few months resulted in overproduction and decrease in price. The conditions of 1913 illustrate overproduction in China, when antimony sold for 2¼ cents per pound in Shanghai. In 1916, due to the influence of the war, antimony sold at an average of 25.33 cents at New York. In December, 1925, the maximum price of antimony at New York was 24½ cents. During January, February, and March, 1926, three attempts were made by the Chinese merchants to form what might be termed an export association. All these attempts were failures, and in May, 1926, the New York price had dropped to 9½ cents per pound, but in August it rose to 16¾ cents.

Chinese regulus is imported into the United States as slabs weighing 30 to 40 pounds, in cases containing 224 pounds net of metal. Regulus marketed by the English comes into the market in casks containing 672 pounds. For many years the trade has demanded what is known as "star antimony." This demand has been based upon a supposed characteristic of pure antimony, namely, that when it is cast in slabs or ingots the exposed surface crystallizes in a form known as a "star." The trade has been content to judge the purity of the metal by this means. However, this appearance can be produced by carrying on the final refining of the metal under a surface of fluxing material, thus making it possible for starred metal to contain a considerable proportion of impurities. Two classes of regulus find a ready market in this country. Ordinary brands, which constitute from 85 to 90 per cent of the total sales, and brands such as Wah Chang's WCC Chinese antimony or Cookson's C brand have an antimony content of more than 99 per cent.

The following is a list of the principal brokers and exporters of Changsha, China, and the relative proportion of the exports of regulus handled by them in 1925:

	Per cent
Alf & Co. (German) Exports to Europe and America.	4. 89
Arnhold & Co. (Ltd.) (British) Exports to Europe and America.	5. 86
L. Bouvet (French) Exports to America.	3. 26
Cookson Lead & Antimony Co. (Ltd.) (British) Buys for own factories in England.	11. 40
East Asiatic Trading Co. (Danish) Exports to Europe.	2. 60
Kai Lee Gung Tse (German) Exports to Europe and America.	52. 12
Mei Tung Corporation (Chinese) (not incorporated) Exports to America.	3. 91
Sinyuan & Co. (Chinese) Exports to America.	. 65
Société Commerciale du Hunan (French) Exports to Europe and America.	. 65
Société d' Importation des Minerais (French) Exports to France.	9. 77
Yamamoto-Yoko (Japanese) Exports to Japan.	4. 89

The exports of Bolivia during the period of high production were handled by the following firms: Aramayo-Francke Co. (Anglo-Bolivian), Ricardo Cruz (Bolivian), Stevenson, Horn & Co. (British), Gonzales y Cia (Bolivian), J. Minor Gainsborg (British), and Kirkwood, Davidson & Co. (British).

The larger part of the exports of regulus from Mexico is handled by Cooksons of England through a subsidiary company, the Republic Mining & Metal Co.

GOLD, SILVER, COPPER, LEAD, AND ZINC IN THE EASTERN STATES[1]

By J. P. Dunlop

MINE PRODUCTION

The total value of the mine production of gold, silver, copper, lead, and zinc in the Eastern States in 1926 was 9 per cent less than the corresponding value in 1925. Of this total value gold represented $14,351, silver $66,480, copper $3,019,394, lead $520,000, and zinc $16,365,050. The mine production of copper and lead increased in quantity and value. The output of gold was only about one-third that of 1925. The quantity of silver recovered was about the same as that in 1925, but the value was considerably less. The quantity of zinc produced in 1926 was nearly 20,000,000 pounds less than that produced in 1925. The quantity of ore sold or treated decreased 12.5 per cent.

Mine production of gold, silver, copper, lead, and zinc in the Eastern States, 1917–1926

Year	Number of mines	Ore sold or treated	Gold	Silver	Copper	Lead	Zinc	Total value
		Short tons		*Fine ozs.*	*Pounds*	*Pounds*	*Pounds*	
1917	(1)	2,709,201	$29,227	106,450	18,061,068	6,879,053	312,960,000	$37,561,200
1918	(1)	2,355,688	14,352	106,585	17,858,535	5,158,329	256,260,000	28,217,800
1919	(1)	1,930,411	7,052	104,690	16,596,182	4,378,000	241,766,000	25,995,600
1920	(1)	2,418,500	8,515	112,183	17,138,675	4,003,078	206,764,000	24,278,000
1921	27	1,502,277	9,934	98,792	15,397,596	------------	135,422,000	12,616,046
1922	29	2,274,175	12,821	80,935	15,476,497	1,472,000	188,082,000	15,881,033
1923	21	2,936,637	11,919	108,799	20,487,395	2,500,000	199,180,000	18,053,666
1924	16	2,851,932	16,535	97,628	19,450,329	4,424,000	212,148,000	19,859,465
1925	19	3,315,912	40,612	106,228	20,824,058	5,354,000	226,814,000	22,068,792
1926	21	2,902,670	14,351	106,539	21,567,100	6,500,000	207,196,000	19,985,275

[1] Figures not available.

GOLD AND SILVER

In the Eastern States the output of gold decreased from $40,612 in 1925 to $14,351 in 1926, although two more mines were worked than in 1925. The smaller production was due chiefly to the cessation of mining at the Rich Cog mine at Reidsville, N. C. The lode and the placer gold mines, from which nearly all the gold produced in the Eastern States has come, supplied only 36.5 per cent of the total in 1926, compared with 70 per cent in 1925. Placers yielded $1,665 in gold in 1926, siliceous ores $3,573, and copper and magnetite ores $9,113. The output of siliceous ores, 4,560 tons, most of which came from one property, was 9,585 tons less than in 1925, and the recovery of gold from them was $24,472 less. Gold mines in most districts were inactive and little capital went into development. Mining costs are still too high to attract capital to southern gold mines. None of the gold lode or placer mines in Alabama were worked, and very little mining was done in South Carolina and Virginia. Three lode mines and three placers in Georgia yielded $3,074 in gold, and two lode mines and one placer in North Carolina yielded $1,631. The gold obtained in refining copper bullion from Tennessee, Pennsylvania, and Vermont, $9,113, was $3,208 less than in 1925, although the output of copper increased in 1926.

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[1] Mineral Resources, 1908, pt. 1, pp. 645 to 681, contains references to the geology of the Eastern States and gives a list of the U. S. Geological Survey, State survey, and other publications that deal with the geology and mines of those States; Mineral Resources, 1914, pt. 1, pp. 139 to 163, contains a historical review of the production of gold in the Southern Appalachian States and a list of U. S. Geological Survey publications on gold, silver, copper, lead, and zinc in the Eastern States.

The value of the estimated production of gold of the Southern Appalachian States for the period 1799 to 1926 is $51,125,788.

All of the silver produced in 1926, except 27 ounces from siliceous ore and 3 ounces from placer bullion, was derived from copper ore and pyritiferous magnetite ore.

Mine production of gold and silver in the Eastern States in 1926, by States

State	Gold		Silver		Increase or decrease in value as compared with 1925	
	Fine ounces	Value	Fine ounces	Value	Gold	Silver
Georgia	148.71	$3,074	9	$5	−$6,609	−$27
North Carolina	78.90	1,631	21	13	−16,909	−62
Pennsylvania	21.77	450	544	339	−4,450	−1,826
South Carolina	15.14	313			+313	
Tennessee	417.09	8,622	104,000	64,896	+1,201	−6,550
Vermont	1.98	41	1,965	1,227	+41	+1,227
Virginia	10.64	220			+152	−4
	694.23	14,351	106,539	66,480	−26,261	−7,242
Total, 1925	1,964.60	40,612	106,228	73,722		

Mine production of gold and silver in the Eastern States in 1926, by sources, in fine ounces

State	Gold			Silver		
	Placers	Dry and siliceous ore	Copper ore	Placers	Dry and siliceous ore	Copper ore
Georgia	52.68	96.03		3	6	
North Carolina	2.08	76.82			21	
Pennsylvania			21.77			544
South Carolina	15.14					
Tennessee			417.09			104,000
Vermont			1.98			1,965
Virginia	10.64					
	80.54	172.85	440.84	3	27	106,509
Total, 1925	11.90	1,356.67	596.03		159	106,069

COPPER

The mine production of copper in the Eastern States in 1926 was valued at $3,019,394, an increase of $62,378 compared with 1925. The output was derived from copper ore from three mines in Tennessee, from one each in North Carolina and Vermont, and from copper concentrates recovered from Pennsylvania pyritiferous magnetite ore. The quantity of ore treated to produce this copper was 1,631,610 short tons. Exclusive of the magnetite ore, which was mined for its iron content and contained little copper, the average yield from copper ore was about 1.61 per cent, or 32.2 pounds to the ton; this copper ore also yielded $0.117 in gold and silver to the ton. The copper concentrates from magnetite ore contained about 3.08 per cent of copper and a small quantity of gold and silver.

Copper ore directly smelted amounted to 321,044 tons, from which about 7,810,251 pounds of copper was recovered. Copper and magnetite ores concentrated amounted to 1,310,566 tons, which yielded 58,957 tons of concentrates; 13,756,849 pounds of copper was recovered from these concentrates.

In 1926 the Fontana Mining Corporation in Swain County, N. C., shipped considerable crude copper ore to smelters, and the American Metal Co. of Vermont, working the old Elizabeth mine in Orange County, Vt., shipped copper concentrates.

LEAD

In 1926, as in 1925, the only output of lead in the Eastern States reported to the Bureau of Mines was made by mines in Tennessee and Virginia. The quantity of lead recovered was 6,500,000 pounds, or 21 per cent more than in 1925.

ZINC

The recoverable zinc in the ore mined in the Eastern States in 1926 was valued at $16,365,050.

[N. B.—The value of the zinc in New Jersey is not that of ore mined. It is the estimated smelting value of the recoverable zinc content of the ore after freight, haulage, smelting, and manufacturing charges are added.]

In 1926, 573,300 short tons of zinc ore was mined in New Jersey, 502,400 tons in Tennessee, and 42,500 tons in New York.

All of the zinc ore from Tennessee and New York went to concentrating plants. In Virginia 144,300 tons of lead-zinc ore was concentrated, yielding both lead and zinc concentrates.

The recoverable zinc, as metal or oxide, in the ore mined in New York in 1926 was 10,082,000 pounds, that mined in Tennessee 24,196,000 pounds, and that mined in Virginia 11,660,000 pounds.

REVIEW BY STATES

Alabama.—The value of the gold produced by mines in Alabama during the period 1830 to 1926 was $766,746. None was reported in 1924, 1925, and 1926. No deep mine was worked in 1926, and practically no prospect work was done at any placer property.

Georgia.—The value of the gold produced in Georgia during the period 1830 to 1926 was $17,843,131, or more than one-third of the estimated total output of the Southern Appalachian States.

In 1926 three lode mines and three placer mines produced $3,074 in gold and 9 ounces of silver. The production of gold in 1925 amounted to $9,683. Of the 1926 output, $1,089 was from placer mining; it came from small properties at Dahlonega, in Lumpkin County, and from Sautee, in White County.

The largest producing lode mine in Georgia in 1925 and 1926 was the Pine Mountain, at Villa Rica, Douglas County. T. H. Aldrich, jr., worked this mine by open cut; the ore was crushed and cyanided.

The Standard and Lockhart mines in Lumpkin County recovered small quantities of gold by amalgamation, and the McGehee property at Dawsonville in Dawson County shipped a little bullion. The Dugas Corporation took over the old Findlay mine at Dahlonega and did some work. The property is being developed, and a 100-ton cyanide plant is under construction. Craig R. Arnold, lessee of the Turkey Hill mine at Dahlonega, was driving three tunnels in 1926, but no ore was milled at the 10-stamp mill.

Maine, Maryland, New Hampshire, and Vermont.—No production of gold, silver, or copper was reported in 1926 by mines in Maine, Maryland, and New Hampshire. The estimated total gold production of Maryland has been $71,405, virtually all of which was produced prior to 1906.

In 1926 the American Metal Co. reopened the old Elizabeth mine at South Strafford, in Orange County, Vt. The pyrrhotite ore, which contains a little gold and silver, was mined through a tunnel and an inclined shaft and milled at a 150-ton concentrating flotation plant. The plant ran from August to January.

New Jersey (see also p. 83).—The production of zinc ore in New Jersey in 1926 amounted to 573,300 short tons, which contained 161,258,000 pounds of recoverable zinc. All the ore mined was treated by the producer.

New York.—The quantity of zinc ore mined in New York in 1926 was 42,500 short tons, and the concentrates shipped yielded about 10,082,000 pounds of zinc.

The Brown mine of the New York Zinc Co., near Edwards, St. Lawrence County, was worked steadily through the 1,300-foot shaft. Ore, in limestone, was mined at various levels, the lowest at 1,200 feet. The 1,560-foot three-compartment shaft was completed in 1925. The ore mined is concentrated, then treated on Weatherby electric separating machines. The zinc concentrates, which carry almost 45 per cent zinc, are shipped to smelters, and the pyrite recovered is mainly sold to pulp mills. Description of the mines and mill is given in earlier volumes of Mineral Resources.

In 1926 the 150-ton plant was modified to use a dry process in place of the wet process. In June, 1926, the property was purchased by the St. Joseph Lead Co., who operated it the remainder of the year.

North Carolina.—The value of the gold produced in North Carolina during the period 1799 to 1926 was $23,660,072. The yield of gold decreased from $18,540 in 1925 to $1,631 in 1926. Few mines were active, and the decrease was due entirely to the idleness of the Rich Cog mine at Reidsville, in Montgomery County, which has a 50-stamp mill equipped with seven Wilfley tables.

The Gold Hill mine at Gold Hill, in Brown County, was under development by the South Gold Hill Mines Co. The Howie mine at Waxhaw in Union County was operated by the Jackson Mining Co., and some bullion was sent to the mint at Philadelphia.

The small output of placer gold, $43, was from Matthews, in Mecklenburg County; the placer mines in Burke and Rutherford Counties did not report any output.

None of the lode gold mines in Cabarrus, Moore, Davidson, or Guilford Counties was worked in 1926.

The output of copper from North Carolina in 1926 was due to the working of the Fontana mine on Eagle Creek in Swain County by the Fontana Mining Corporation. More than 2,200 feet of drifts and winzes were cut, and a narrow-gauge railway was constructed. The crude copper ore was shipped to the Ducktown Chemical & Iron Co., Isabella, Tenn., and to the Norfolk Smelting Co., Norfolk, Va.

Pennsylvania.—None of the lead prospects in Bucks County produced any lead. The Cornwall iron mines in Lebanon County continued to be worked as open pits by the Bethlehem Steel Co. and yielded about 13,400 tons of low-grade copper concentrates from pyritiferous magnetite. These concentrates were recovered on Wilfley tables and were shipped to smelters; they contained about 32 per cent of sulphur, 3.08 per cent of copper, and a very little gold and silver.

South Carolina.—Mines in South Carolina yielded $5,182,618 in gold during the period 1829 to 1926. The only production of gold reported was from the Brewer placer mine near Jefferson in Chesterfield County. None of the lode mines in Spartanburg or York Counties was worked in 1926.

Tennessee.—The gold produced in Tennessee during the period 1831 to 1926 amounted to $303,380. Most of the output prior to 1879 was derived from placer mines in Monroe County, but the production since 1906 has come entirely from copper ores mined in Polk County. The total value of the mine production of metals in Tennessee decreased $816,509 in 1926. There were small increases in gold and in the quantity of silver and a large increase in the quantity and value of lead. The decrease in the quantity and value of both copper and zinc was large.

Mine production of gold, silver, copper, lead, and zinc in Tennessee, 1917–1926

Year	Ore sold or treated	Gold	Silver	Copper	Lead	Zinc	Total value
	Short tons		*Fine ounces*	*Pounds*	*Pounds*	*Pounds*	
1917	1,533,983	$5,326	99,053	16,033,749	5,061,937	56,995,107	$10,712,985
1918	1,159,971	4,866	93,620	14,799,680	3,410,400	42,141,311	7,831,005
1919	1,227,534	5,662	98,288	15,623,589	4,376,000	46,494,000	6,647,723
1920	1,120,995	5,830	110,719	16,727,803	3,957,000	38,434,000	6,634,144
1921	889,122	4,920	98,762	15,084,294	------------	19,384,000	3,018,756
1922	983,844	4,320	78,341	14,240,571	1,464,000	31,136,000	3,860,410
1923	1,355,547	6,615	105,712	18,721,932	2,500,000	31,800,000	5,182,823
1924	1,443,159	6,800	94,779	18,335,635	1,874,000	28,752,000	4,491,070
1925	1,711,298	7,421	102,949	19,788,234	896,000	32,512,000	5,437,660
1926	1,114,400	8,622	104,000	18,606,664	1,600,000	24,196,000	4,621,151

The entire output of copper, gold, and silver in Tennessee in 1926 came from three copper mines in the Ducktown district, and the output of ore and the metal content were less than in 1925.

The Tennessee Copper Co. ran its 600-ton flotation plant, 1,500-ton blast furnace, Pierce Smith converter, sulphuric-acid plant, and copper-sulphate plant on sulphide ore from the Burra Burra, London, and Eureka mines. The Polk County mine was not worked in 1926.

Almost 9,600 feet of development work was done. The pig copper was shipped to the Nichols Copper Co. for refining.

The Ducktown Chemical & Iron Co. operated one 600-ton blast furnace and one converter on self-fluxing sulphide ore and concentrates from the Mary mine and Isabella mines. The larger part of the crude ore was concentrated at the 600-ton flotation plant. The Mary mine is opened by a 1,200-foot vertical shaft and drifts. Part of the crude copper ore from the Fontana mine in North Carolina was treated at the smelter.

The Ocoee Copper Co. operated its mine and concentrating plant in 1926. The concentrate produced was shipped to the Norfolk Smelting Co.

Most of the zinc shipped was obtained from the Embree mine in Washington County and the Mascot mine in Jefferson County. The only exploration or development done in 1926 was at the Grasselli property, near New Market, in Jefferson County. A concentrating plant is to be constructed, but it is improbable that milling will be done before 1928.

The Embree mine shipped less zinc carbonate in 1926 but more lead carbonate ores. Some of the carbonate was shipped crude, but most of it was concentrated. The zinc carbonate concentrates averaged 40.5 per cent zinc content and the lead carbonate ore and concentrates 61.8 per cent lead.

Operations at the Mascot mine and mill of the American Zinc Co. of Tennessee continued steady. The zinc ore, in dolomitic limestone, was hoisted through two 700-foot shafts and concentrated at a 125-ton per hour plant equipped with oil flotation, ball mills, Cooley jigs, tables, Oliver filter, and Lowden dryer. The crushed tailings are sold for agricultural and other uses.

Virginia.—The value of the gold produced from mines in Virginia during the period 1828 to 1926 was $3,298,436, of which only about $9,200 was produced during the last 16 years. The lode and the placer gold mines in Albemarle, Floyd, Fauquier, Goochland, and Fluvanna Counties yielded about half of the total gold; the remainder was derived from cinders of pyritic ores or copper ore shipped to smelters.

Mines in Virginia in 1926 produced 10.64 ounces of gold, 4,900,000 pounds of lead, and 11,660,000 pounds of zinc, having a total value of $1,266,720. The gold came from a small placer mine in Spotsylvania County.

IRON ORE, PIG IRON, AND STEEL

By Hubert W. Davis [1]

GENERAL REVIEW

In 1926 the production and the shipments of iron ore increased 9 and 8 per cent, respectively, as compared with 1925. The production ranked about with that of 1920, and was 129 per cent of the average for the preceding 5 years and 111 per cent of the average for the preceding 10 years. The output of pig iron, including ferroalloys, increased 7 per cent as compared with 1925 and was about 129 per cent of the average of the preceding 5 years and about 117 per cent of the average for the preceding 10 years. The output in 1926 was about equal to that of 1916, and was the third largest on record.

The average value per ton for iron ore at the mines was virtually the same in both 1926 and 1925, but that of pig iron at the blast furnaces declined 2 per cent. The quoted prices of ferromanganese and steel were lower but the price of spiegeleisen was higher. With respect to operating conditions and resulting production in the iron and steel industry the year 1926 was highly satisfactory. Earnings of 26 of the leading steel manufacturers in the United States, according to the Iron Trade Review,[2] showed a return on capitalization of 6.7 per cent in 1926 as compared with 5.6 per cent in 1925.

Labor and transportation conditions seem to have been satisfactory at both mines and mills.

The railroads were the leading buyers of steel in 1926; they were followed by building and construction, automotive manufacturing, oil, gas, and mining industries, exports, food containers, machinery, and agriculture.

The total domestic output of pig iron required about 75 per cent of the theoretical annual capacity, according to figures of the American Iron and Steel Institute, but this capacity was not utilized steadily. At the beginning of 1926 there were 238 furnaces in blast; on June 30 there were 224; and at the end of the year there were only 210. The production of steel ingots is considered to have been about 81 per cent of the theoretical capacity, having ranged from about 72 per cent of the capacity in December to 92 per cent in March. The output of pig iron in the United States represented more than one-half of the world's production and was considerably larger than that of all the producing countries of Europe combined. The production of these European countries decreased about 4 per cent compared with an increase of 7 per cent in the United States.

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[1] Figures of imports and exports compiled by J. A. Dorsey, of the Bureau of Mines, from records of the Bureau of Foreign and Domestic Commerce.

[2] Hill, J. W., "Steel profits gain in 1926 but still rank low in industrial scale": Iron Trade Rev., vol. 80, Mar. 31, 1927, pp. 828-830.

Iron-ore mining in the Lake Superior district had a busy year in 1926 because of larger demand, although ore prices were the same as in 1925. Eastern furnaces took about 800,000 tons of Lake ore; they bought chiefly foreign ores that they could get more cheaply. Although the established price of Lake ore was the same as in 1925, some improvement in earnings was reported over 1925, chiefly because of the larger output, but economies effected by the more general use of mechanical equipment or the substitution of more efficient equipment were said to have been important factors. The season of 1926 ended with stock piles smaller than at the close of 1925. The total decrease in stocks in the Lake Superior district amounted to 13 per cent.

IRON ORE

QUANTITIES MINED AND SHIPPED IN 1926

In the accompanying table the quantities of iron ore shown include ore that was beneficiated, that is, treated in any way, as well as crude ore not requiring treatment. The figures on both production and shipments include the iron ore used for fluxing other metallic ores at smelters in the Western States, but the shipments do not include the iron ore sold for the manufacture of paint, which amounted to 21,167 gross tons in 1926, valued at $129,541, or $6.12 a ton, compared with 26,521 tons in 1925, valued at $140,986, or $5.32 a ton. The output of manganiferous iron ore (including ore used for flux) which contained 5 per cent or more of manganese amounted to 1,217,431 gross tons, valued at $3,138,489, as compared with 1,448,054 tons, valued at $3,752,486, in 1925. In Arkansas one producer shipped a small quantity of loadstone which is not included in the tabulated statistics of iron ore. Neither do the statistics include iron sinter recovered from copper sulphide ore, 38,545 gross tons of which, carrying more than 63 per cent of iron, was made in Tennessee in 1926.

Iron ore was mined in 19 States in 1926, as compared with 20 States in 1925, Ohio having dropped out. All the iron ore produced in California and Montana and a small quantity of that produced in Minnesota, New Jersey, and Utah was used for flux; a small quantity of ore from New Jersey and Pennsylvania was used for purifying gas; all the output from Washington was used in the manufacture of ferromagnesite the ore produced in the remaining States was mainly for use in blast furnaces; Michigan, New York, North Carolina, Pennsylvania, Tennessee, and Wisconsin produced small quantities that were used for paint. The rank of the three States producing the largest quantity of iron ore—Minnesota, Michigan, and Alabama—remained virtually unchanged. Minnesota, which has furnished nearly 61 per cent of the total for the United States in the last five years, is producing more iron ore than all the rest of the States together.

The ores of iron are classed under the four heads—hematite, brown ore, magnetite, and carbonate.[3]

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[3] Notes on the composition of these ores are given in Mineral Resources, 1916, pt. 1, 1918, pp. 537-541.

Iron ore mined in the United States, 1925-26, by States and varieties, in gross tons, with percentage of increase or decrease in 1926

[Exclusive of ore containing 5 per cent or more of manganese]

State	Number of active mines	Hematite	Brown ore	Magnetite	Carbonate	Total	Percentage of increase or decrease in 1926
1925							
Alabama	24	6,453,875	639,375			7,093,250	
California	1			352		352	
Colorado	1		8,642			8,642	
Georgia	7	11,618	67,217			78,835	
Michigan	67	14,490,529				14,490,529	
Minnesota	92	36,856,244				36,856,244	
Missouri	2	40,043				40,043	
Montana	4	(1)	[1] 3,672			3,672	
New Jersey	2			202,942		202,942	
New Mexico	2			172,959		172,959	
New York	5	15,731		125,803		141,534	
North Carolina	3		5,753	16,258		22,011	
Ohio	1				2,410	2,410	
Pennsylvania	4		1,039	952,623	2,293	955,955	
Tennessee	6	106,557	58,160			164,717	
Utah	4	[1] 265,322	[1] 4,470	237		270,029	
Virginia	4		96,272			96,272	
Washington	1			830		830	
Wisconsin	7	817,149				817,149	
Wyoming	1	489,622				489,622	
	238	[1] 59,546,690	[1] 884,600	1,472,004	4,703	61,907,997	
1926							
Alabama	24	6,205,451	642,338			6,847,789	−3
California	1			282		282	−20
Colorado	1		35,535			35,535	+311
Georgia	5		51,642			51,642	−34
Michigan	68	15,248,254				15,248,254	+5
Minnesota	90	40,701,613				40,701,613	+10
Missouri	3	120,000	4,371			124,371	+211
Montana	4		724			724	−80
New Jersey	2			209,117		209,117	+3
New Mexico	1			216,269		216,269	+25
New York	8	(2)		[2] 638,849		638,849	+351
North Carolina	2		400	14,798		15,198	−31
Pennsylvania	4		1,140	1,092,150	2,215	1,095,505	+15
Tennessee	6	108,040	30,779			138,819	−16
Utah	4	[1] 275,567	[1] 17,321	2,121		295,009	+9
Virginia	2	22,485	26,674			49,159	−49
Washington	1			1,702		1,702	+105
Wisconsin	6	1,322,776				1,322,776	+62
Wyoming	1	630,387				630,387	+29
	233	[1, 2] 64,634,573	[1] 810,924	[3] 2,175,288	2,215	67,623,000	+9

[1] Some hematite included with brown ore.

[2] Some hematite included with magnetite.

Iron ore mined in the United States, by mining districts and varieties, 1925–26, in gross tons

[Exclusive of ore containing 5 per cent or more of manganese]

District	Hematite	Brown ore	Magnetite	Carbonate	Total	Percentage of increase or decrease in 1926
1925						
Lake Superior [1]	52, 056, 663				52, 056, 663	
Birmingham	6, 312, 207	323, 599			6, 635, 806	
Chattanooga	259, 843	96, 877			356, 720	
Adirondack Northern New Jersey and southeastern New York			328, 745		328, 745	
Other districts	[2] 917, 977	[2] 464, 124	1, 143, 259	4, 703	2, 530, 063	
	[2] 59,546, 690	[2] 884, 600	1, 472, 004	4, 703	61, 907, 997	
1926						
Lake Superior [1]	57, 143, 407				57, 143, 407	+10
Birmingham	6, 114, 917	393, 300			6, 508, 217	−2
Chattanooga	198, 574	68, 550			267, 124	−25
Adirondack Northern New Jersey and southeastern New York			[3] 847, 966		[3] 847, 966	+158
Other districts	[2] [3] 1, 177, 675	[2] 349, 074	1, 327, 322	2, 215	[3] 2, 856, 286	+13
	[2] [3] 64,634,573	[2] 810, 924	[3] 2, 175, 288	2, 215	67, 623, 000	+9

[1] Includes only those mines in Wisconsin which are in the true Lake Superior district.
[2] Some hematite included with brown ore.
[3] Some hematite from "Other districts" included with magnetite from Adirondack district.

The Lake Superior district, which comprises Minnesota, Michigan, and northern Wisconsin, mined nearly 85 per cent of the total ore produced in 1926, and the Birmingham district mined nearly 10 per cent. The Birmingham and Chattanooga districts were the only ones to produce less ore in 1926 than in 1925.

The following table shows the production of iron ore in the United States so far as it has been recorded or estimated. The figures for the years prior to 1860 are not strictly accurate, as they were calculated from the pig iron produced and included both imported and domestic ore. Details for the years 1880 to 1916 may be found in Mineral Resources for 1916.

Iron ore mined in the United States, 1810–1926, in gross tons

[Exclusive after 1905 of ore containing 5 per cent or more of manganese]

Year	Hematite	Brown ore	Magnetite	Carbonate	Total
1810–1869					49, 656, 000
1870 [1]–1880					51, 690, 889
1881–1890					103, 854, 386
1891–1900	136, 961, 046	22, 845, 764	14, 634, 364	1, 065, 137	175, 506, 311
1901–1910	364, 179, 432	[2] 28, 287, 994	[2] 20, 664, 453	262, 366	413, 394, 245
1911–1915	239, 419, 251	8, 355, 102	10, 156, 539	42, 495	257, 973, 387
1916	70, 728, 024	1, 904, 484	2, 533, 364	1, 800	75, 167, 672
1917	70, 743, 513	1, 992, 332	2, 553, 006		75, 288, 851
1918	65, 894, 709	1, 613, 844	2, 149, 725		69, 658, 278
1919	[3] 57, 719, 582	1, 127, 397	[3] 2, 118, 439		60, 965, 418
1920	[3] [4] 63, 883, 523	[4] 1, 325, 661	[3] 2, 391, 541	3, 740	67, 604, 465
1921	[3] [4] 28, 337, 249	[4] 370, 154	[3] 780, 866	2, 709	29, 490, 978
1922	[4] 44, 888, 723	[4] 783, 582	1, 452, 966	3, 256	47, 128, 527
1923	[4] 65, 924, 454	[4] 1, 232, 848	2, 190, 624	3, 516	69, 351, 442
1924	[4] 52, 102, 300	[4] 814, 159	1, 347, 711	3, 249	54, 267, 419
1925	[4] 59, 546, 690	[4] 884, 600	1, 472, 004	4, 703	61, 907, 997
1926	[4] [5] 64, 634, 573	[4] 810, 924	[5] 2, 175, 288	2, 215	67, 623, 000
					1, 730, 529, 265

[1] Includes ore produced by owners of blast furnaces, estimated by census at 800, 000 tons.
[2] Some brown ore included with magnetite.
[3] Some magnetite included with hematite.
[4] Some hematite included with brown ore.
[5] Some hematite included with magnetite.

The ore reported as sold for flux other than that used in the smelting of pig iron amounted to 51,934 gross tons, valued at $72,703, as compared with 34,876 tons, valued at $63,678, in 1925. The ore reported sold for purifying gas amounted to 3,605 gross tons, valued at $26,217, as compared with 1,969 tons, valued at $16,829, in 1925. The domestic iron ore sold for the manufacture of pig iron amounted to 69,235,591 gross tons, valued at $173,912,045, as compared with 63,887,088 tons, valued at $160,714,511, in 1925.

Iron ore shipped from mines in the United States, 1925–26, by States

[Exclusive of ore containing 5 per cent or more of manganese and of ore sold for paint]

State	1925		1926			
	Gross tons	Value	Gross tons	Value	Percentage of increase or decrease	
					Quantity	Value
Alabama	6, 891, 081	$14, 134, 677	6, 871, 412	$13, 846, 656	−0. 3	−2
California	352	(1)	282	(1)	−20	----------
Colorado	8, 642	(1)	35, 535	(1)	+311	----------
Georgia	79, 488	231, 683	51, 642	149, 198	−35	−36
Michigan	15, 254, 003	40, 926, 315	16, 699, 984	43, 932, 982	+9	+7
Minnesota	38, 022, 237	96, 083, 485	40, 961, 361	103, 715, 621	+8	+8
Missouri	40, 043	(1)	124, 371	532. 536	+211	----------
Montana	3, 672	10, 244	724	1, 810	−80	−82
New Jersey	164, 523	678, 021	212, 152	925, 403	+29	+36
New Mexico	172, 959	(1)	216, 269	(1)	+25	----------
New York	413, 517	1, 988, 735	659, 741	3, 015, 586	+60	+52
North Carolina	22, 011	49, 511	14, 798	31, 645	−33	−36
Ohio	2, 410	(1)	----------	----------	−100	−100
Pennsylvania	917, 255	2, 149, 800	1, 088, 634	2, 483, 056	+19	+16
Tennessee	164, 073	369, 144	138, 307	312, 109	−16	−15
Utah	268, 529	361, 251	296, 943	411, 611	+11	+14
Virginia	76, 302	174, 454	49, 703	162, 446	−35	−7
Washington	830	(1)	1, 702	(1)	+105	----------
Wisconsin	933, 214	2, 260, 388	1, 238, 885	3, 178, 156	+33	+41
Wyoming	489, 622	(1)	630, 387	(1)	+29	----------
Undistributed	----------	[2] 1, 379, 178	----------	[2] 1, 316, 830	----------	----------
	63, 924, 763	160, 796, 886	69, 292, 832	174, 015, 645	+8	+8

[1] Included under "Undistributed." [2] This figure includes value for States entered as "(1)" above.

Iron ore shipped from mines in the United States, 1917–1926

[Exclusive of ore containing 5 per cent or more of manganese and of ore sold for paint]

Year	Gross tons	Value	Year	Gross tons	Value
1917	75, 573, 207	$238, 260, 444	1922	50, 612, 620	$157, 809, 286
1918	72, 021, 202	244, 368, 147	1923	69, 811, 472	240, 738, 921
1919	56. 372, 784	197, 312, 517	1924	52, 083, 375	151, 307, 105
1920	69, 281, 341	285, 006, 327	1925	63, 924. 763	160, 796, 886
1921	26, 652, 528	89, 745, 308	1926	69, 292, 832	174, 015, 645

PRINCIPAL IRON-ORE MINES

In 1926, 233 iron-ore mines were active, compared with 238 in 1925 and 260 in 1924; 140 mines produced more than 100,000 gross tons of iron ore each, compared with 130 in 1925 and 117 in 1924. Of these 140 mines, 12 (9 in Minnesota, 2 in Alabama, and 1 in Michigan) produced more than 1,000,000 tons each, as against 10 (8 in Minnesota, 1 in Alabama, and 1 in Michigan) in 1925, and 9 (7 in Minnesota, 1 in Alabama, and 1 in Michigan) in 1924. The operators of all but one of these large mines have permitted the publication of output, and the figures are given in the table that follows. The predominance of hematite as an iron ore is clearly shown by the fact that of these 140 large mines only 7 produced magnetite and 1 produced brown ore. The trend toward large mining units is shown in the production of more than 96 per cent of the output of the country by the 140 mines that yielded more than 100,000 tons each. The 12 mines that produced more than 1,000,000 tons each in 1926 furnished nearly 41 per cent of the total. The average production per mine in 1926 was 290,227 tons, as compared with 260,118 tons in 1925.

Iron-ore mines of the United States that produced more than 100,000 gross tons each in 1926

Rank	Name of mine	State	Nearest town	Variety of ore	Gross tons
1	Missabe Mountain	Minnesota	Virginia	Hematite	5, 676, 396
2	Hull-Rust	do	Hibbing	do	4, 537, 605
3	Red Mountain group	Alabama	Bessemer	do	3, 278, 130
4	Mahoning	Minnesota	Hibbing	do	2, 525, 925
5	Morris	do	do	do	1, 829, 784
6	Sellers	do	do	do	1, 544, 122
7	Adams-Spruce group	do	Eveleth	do	1, 472, 534
8	Norrie group	Michigan	Ironwood	do	1, 459, 998
9	Hill Annex	Minnesota	Calumet	do	1, 440, 253
10	Leonidas	do	Eveleth	do	1, 416, 032
11	Arcturus	do	Marble	do	1, 275, 771
12	Woodward Nos. 1, 2, and 3	Alabama	Bessemer	do	1, 023, 141
13	Cornwall	Pennsylvania	Miners Village	Magnetite	989, 966
14	Fayal	Minnesota	Eveleth	Hematite	759, 831
15	Dunwoody	do	Chisholm	do	741, 376
16	Kerr	do	Hibbing	do	739, 234
17	Pioneer	do	Ely	do	699, 316
18	Newport (including Bonnie)	Michigan	Ironwood	do	680, 954
19	Bennett	Minnesota	Keewatin	do	648, 149
20	Sunrise	Wyoming	Sunrise	do	630, 387
21	Wakefield	Michigan	Wakefield	do	608, 276
22	Sloss Nos. 1 and 2	Alabama	Bessemer	do	584, 196
23	Montreal	Wisconsin	Montreal	do	569, 523
24	Hawkins	Minnesota	Nashwauk	do	567, 520
25	Raimund Nos. 1 and 2	Alabama	Bessemer	do	565, 256
26	Ironton	Michigan	do	do	540, 400
27	Susquehanna	Minnesota	Hibbing	do	528, 499
28	Glen	do	Chisholm	do	527, 927
29	Boeing	do	Hibbing	do	513, 616
30	Hill-Trumbull	do	Marble	do	502, 364
31	Eureka (including Asteroid)	Michigan	Ramsay	do	494, 085
32	Chapin	do	Iron Mountain	do	423, 631
33	Lone Jack	Minnesota	Virginia	do	423, 477
34	Wabigon	do	Buhl	do	406, 683
35	Scranton	do	Hibbing	do	404, 033
36	Corsica	do	McKinley	do	403, 685
37	Utica	do	Hibbing	do	402, 606
38	Penn group	Michigan	Norway and Vulcan	do	399, 395
39	Bristol (including Youngstown)	do	Crystal Falls	do	393, 933
40	Plymouth	do	Wakefield	do	388, 105
41	St. Paul	Minnesota	Keewatin	do	387, 574
42	Zenith	do	Ely	do	386, 541
43	Wellington	do	Chisholm	do	368, 413
44	Negaunee	Michigan	Negaunee	do	363, 242
45	Webb	Minnesota	Hibbing	do	361, 469
46	South Agnew	do	Buhl	do	348, 522
47	Cliffs Shaft	Michigan	Ishpeming	do	340, 253
48	Danube	Minnesota	Bovey	do	334, 749
49	Redding	Alabama	Bessemer	do	332, 420
50	Leonard	Minnesota	Chisholm	do	328, 513
51	Patrick	do	Pengilly	do	324, 092
52	Miller	do	Aurora	do	317, 753
53	Alexandria	do	Chisholm	do	314, 419
54	Richmond	Michigan	Palmer	do	312, 519
55	Old Bed	New York	Mineville	Magnetite	311, 203
56	Laura	Minnesota	Hibbing	Hematite	309, 351
57	Berkshire	Michigan	Stambaugh	do	306, 311
58	Caspian	do	Iron River	do	304, 055
59	La Rue	Minnesota	Nashwauk	do	302, 449
60	Biwabik (including Cincinnati)	do	Biwabik	do	300, 797
61	Lake Superior	Michigan	Ishpeming	do	300, 508
62	Palms	do	Bessemer	do	296, 689
63	James	do	Iron River	do	295, 333
64	Morris-Lloyd	do	Ishpeming	do	290, 162
65	Maroco	Minnesota	Ironton	do	285, 795
66	Sargent	do	Keewatin	do	282, 792
67	Aragon	Michigan	Norway	do	276, 540

Iron-ore mines of the United States that produced more than 100,000 gross tons each in 1926—Continued

Rank	Name of mine	State	Nearest town	Variety of ore	Gross tons
68	Sibley	Minnesota	Ely	Hematite	276,481
69	Rogers	Michigan	Iron River	do	275,310
70	Ottawa	Wisconsin	Montreal	do	274,880
71	Sunday Lake	Michigan	Wakefield	do	267,961
72	Harold	Minnesota	Stuntz	do	263,129
73	Armour No. 1	do	Crosby	do	262,524
74	No. 5 Shaft	Wisconsin	Montreal	do	261,496
75	Burt (including Pool and Day)	Minnesota	Hibbing	do	250,069
76	Wanless	Michigan	Buhl	do	247,476
77	Maas	do	Negaunee	do	244,651
78	Puritan	do	Ironwood	do	242,124
79	Lincoln	Minnesota	Virginia	do	242,077
80	Armour No. 2 (including Cuyuna-Duluth).	do	Crosby	do	241,415
81	Hiawatha	Michigan	Iron River	do	239,251
82	Shada	Minnesota	Nashwauk	do	233,665
83	Russellville	Alabama	Russellville	Brown ore	232,530
84	Stephenson	Michigan	Gwinn	Hematite	227,576
85	Athens	do	Negaunee	do	226,415
86	Higgins No. 2 (including MacEwen).	Minnesota	Virginia	do	226,195
87	Odgers	Michigan	Crystal Falls	do	222,200
88	Mikado	do	Wakefield	do	216,993
89	Union Hill (including Republic)	New Mexico	Fierro	Magnetite	216,269
90	Baltic (including Fogarty and Buck).	Michigan	Iron River	Hematite	215,861
91	Mississippi	Minnesota	Keewatin	do	212,712
92	Balkan (including Judson)	Michigan	Alpha	do	209,708
93	Riverton group	do	Iron River	do	203,726
94	Keweenaw	do	Bessemer	do	203,203
95	Albany	Minnesota	Hibbing	do	202,218
96	Harrison	do	Pengilly	do	199,632
97	Meacham	do	Crosby	do	197,087
98	Holmes	Michigan	Ishpeming	do	191,358
99	Shenango	Minnesota	Chisholm	do	191,241
100	Isabella	Michigan	Palmer	do	189,596
101	Rolling Mill	do	Negaunee	do	188,295
102	North Harrison	Minnesota	Pengilly	do	187,239
103	Chisholm	do	Chisholm	do	186,649
104	Maitland	Michigan	Palmer	do	183,907
105	Zimmerman	do	Gaastra	do	180,968
106	Leetonia	Minnesota	Carson Lake	do	180,215
107	Monongahela	Michigan	Crystal Falls	do	179,465
108	Homer	do	Iron River	do	178,360
109	Mary Charlotte	do	Negaunee	do	174,605
110	Shannon	Alabama	Birmingham	do	170,419
111	Barnes Hecker	Michigan	Ishpeming	do	163,380
112	Forbes	do	Iron River	do	160,564
113	Volunteer	do	Palmer	do	154,680
114	Desert Mound	Utah	Iron Springs	do	150,000
115	Irondale No. 2	Alabama	Irondale	do	147,305
116	Warner	Michigan	Amasa	do	146,767
117	Ogden	do	Ishpeming	do	146,501
118	Mt. Hope	New Jersey	Wharton	Magnetite	141,005
119	Dean	Minnesota	Buhl	Hematite	140,046
120	Cambria (including Lillie)	Michigan	Negaunee	do	139,591
121	Soudan	Minnesota	Soudan	do	138,362
122	Davidson No. 1	Michigan	Iron River	do	137,300
123	Kinney	Minnesota	Kinney	do	132,108
124	(1)	(1)	(1)	(1)	132,056
125	Mayville	Wisconsin	Mayville	Hematite	128,897
126	Shiras	Minnesota	Buhl	do	126,523
127	Lamberton	do	Hibbing	do	125,731
128	Iron Springs	Utah	Iron Springs	do	125,567
129	Smith	Minnesota	Hibbing	do	124,227
130	Bengal	Michigan	Iron River	do	123,970
131	Carpenter	do	Crystal Falls	do	123,870
132	Tilden	do	Bessemer	do	120,621
133	Louise	Minnesota	Ironton	do	120,480
134	Bates	Michigan	Iron River	do	119,770
135	Harmony	New York	Mineville	Magnetite	116,542
136	Townsite	Michigan	Ironwood	Hematite	110,070
137	Imperial	do	Michigamme	do	105,610
138	French Creek	Pennsylvania	St. Peters	Magnetite	102,184
139	Mary Ellen	Minnesota	Biwabik	Hematite	100,499
140	York	do	Nashwauk	do	100,301
	Total (140 mines)				65,020,256
	Output of 20 mines producing between 50,000 and 100,000 gross tons each				1,486,779
	Output of 73 mines producing less than 50,000 gross tons each				1,115,965
	Grand total of United States (233 mines)				67,623,000

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[1] Bureau of Mines not at liberty to publish identification.

STOCKS OF ORE AT MINES

According to the reports of producers, the total quantity of iron ore in stock at the mines at the end of 1926 amounted to 9,565,880 gross tons, compared with 10,795,630 tons at the end of 1925, a decline of 11 per cent. As the quantity of ore in stock piles is of necessity partly estimated, resulting variations in the mine reports from year to year prevent an absolute balance between the quantity mined, the quantity shipped, and the stocks on hand. The reported stocks at the end of 1926 were about 1,981,000 tons below the average for the preceding five years and are the lowest since 1918.

Stocks of iron ore at mines December 31, 1925 and 1926, by States, in gross tons

State	1925	1926	State	1925	1926
Alabama	942,448	912,702	Pennsylvania	37,607	42,263
Iowa	12,165	12,165	Utah	1,934	---
Michigan	6,769,006	5,527,102	Virginia	26,473	25,929
Minnesota	2,645,543	2,505,982	Wisconsin	54,075	175,629
Missouri	2,629	2,629			
New Jersey	149,974	146,957		10,795,630	9,565,880
New York	153,776	214,522			

VALUE OF ORE PER TON

The table that follows gives the average value, at the mines, of the different classes of iron ore in 1925 and 1926 for each of the producing States or groups of States except where the shippers of a certain variety of ore in a State were less than three and permission was not given to publish the value. These figures are taken directly from statements of the producers and probably represent the commercial selling prices only approximately, as all the reports are not consistent. Some of them evidently include mining costs only; others contain, in addition, the cost of selling and insuring the ore; others include an allowance for a sinking fund; and still others are the costs charged against the blast furnaces. None of the reports, however, is supposed to include freight charges.

Average value per gross ton of iron ore at mines in the United States, 1925–26[1]

[Exclusive of ore containing 5 per cent or more of manganese and of ore sold for paint]

State	Hematite		Brown ore		Magnetite	
	1925	1926	1925	1926	1925	1926
Alabama	$1.98	$1.94	$2.79	$2.74	---	---
Georgia	(2)	---	3.04	2.89	---	---
Michigan	2.68	2.63	---	---	---	---
Minnesota	2.53	2.53	---	---	---	---
Montana	(3)	---	[3]2.79	2.50	---	---
New Jersey	---	---	(2)	(2)	$4.11	(2)
New York	---	---	---	---	4.81	$4.57
North Carolina	---	---	2.30	---	(2)	2.14
Pennsylvania	---	---	(2)	(2)	2.33	2.27
Tennessee	1.97	2.00	2.77	3.15	---	---
Virginia	---	3.00	2.29	3.50	---	---
Wisconsin	2.42	2.57	---	---	---	---
Other States[4]	1.71	1.61	3.31	3.21	1.94	3.11
	2.50	2.49	2.78	2.83	3.07	3.13

[1] Carbonate of iron, used in making pig iron, was sold by one producer in Ohio in 1925.

[2] Less than three producers; permission to publish not given, therefore value may not be shown.

[3] Value for hematite included with brown ore.

[4] 1925: California, Colorado, Missouri, New Mexico, Utah, Washington, and Wyoming; 1926: California, Colorado, Missouri, New Jersey, New Mexico, Utah, Washington, and Wyoming.

The following table summarizes the average value of iron ore at the mines for the years 1914 to 1926. Not until 1917 did the average value rise above $3 a ton, and the average for 1920, $4.11, is the highest on record.

Average value per gross ton of iron ore at mines in the United States, 1914–1926

[Exclusive of ore containing 5 per cent or more of manganese and of ore sold for paint]

Year	Hematite	Brown ore	Magnetite	Carbonate	General average [1]
1914	$1.79	$1.72	$2.39	$2.44	$1.81
1915	1.80	1.80	2.50	2.44	1.83
1916	2.32	2.03	3.11	3.00	2.34
1917	3.12	2.95	4.29	----------	3.15
1918	3.35	3.51	4.60	----------	3.39
1919	3.48	3.63	4.08	----------	3.50
1920	4.09	4.19	4.59	(2)	4.11
1921	3.37	2.63	3.61	(2)	3.37
1922	3.14	2.65	2.37	(2)	3.12
1923	3.46	2.88	3.34	(2)	3.45
1924	2.91	2.75	2.95	(3)	2.91
1925	2.50	2.78	3.07	(3)	2.52
1926	2.49	2.83	3.13	(2)	2.51

[1] Average values in 1889 and 1892–1913 are given in Mineral Resources for 1919 and many earlier volumes.

[2] Sold for paint and not included in shipments of iron ore.

[3] Carbonate of iron, used in making pig iron, was sold by one producer in Ohio in 1924 and 1925; that from Pennsylvania was sold for paint.

IRON ORE CONSUMED

The furnaces in Alabama consumed in 1926 an average of 2.308 tons of ore in making a ton of pig iron, the highest average for any State. The greater part of the iron ore used in Alabama furnaces in 1926 was hematite from mines in Etowah and Jefferson Counties, Ala. The brown ore used was obtained chiefly from mines in the Birmingham and Russellville districts, Ala., and the Cedartown district, Ga., and the manganiferous iron ore was chiefly from mines in Alabama, Arkansas, Georgia, and Virginia.

In 1926 the furnaces in Maryland used only foreign ores, which were obtained chiefly from Chile and Cuba; some ores from France, Spain, and Sweden were also used. The Maryland furnaces consumed an average of only 1.375 tons of ore in making a ton of pig iron in 1926, the lowest for any State, but they used proportionately more cinder, scale, and scrap than the furnaces in Alabama.

The furnaces in Indiana, Kentucky, Michigan, Minnesota, Ohio, and West Virginia used Lake Superior iron ore and manganiferous iron ore exclusively in 1926, and the furnaces in Wisconsin used ore from mines in the Lake Superior district and from the Mayville mine, in southern Wisconsin. The consumption of ores per ton of iron made ranged from 1.464 to 1. 789 tons in 1926.

All the iron ore and manganiferous iron ore used by the furnaces in the Chicago district, including Joliet, Ill., was obtained from mines in the Lake Superior district. The furnaces at Granite City, Ill., used ore chiefly from mines in the Lake Superior district, and in addition used ore from the Barrett, Iron Mountain, and Rueppele mines in Missouri. An average of 1.781 tons of ore was used to make a ton of pig iron in 1926.

In New York, the furnaces in the Buffalo district used ores from the Lake Superior district and from Port Henry, N. Y., and the furnaces at Port Henry, Standish, and Troy used, in addition to a little Lake ore, magnetites from the Harmony, New Bed, Old Bed, and No. 21 mines, at Mineville, N. Y., from the Forest of Dean mine, at Fort Montgomery, N. Y., and from the Chateaugay mine, at Lyon Mountain, N. Y. In making a ton of pig iron the furnaces in New York used an average of 1.789 tons of ore in 1926.

The furnaces in western Pennsylvania used ores mostly from the Lake Superior district; those in the eastern part of the State used, in addition to some Lake ores, magnetites from the Cornwall and French Creek mines in Pennsylvania, magnetites from the Mt. Hope and Richard mines in New Jersey, magnetites from the Chateaugay, Harmony, Old Bed, and Forest of Dean mines in New York, and considerable quantities of ores from Africa, Chile, Cuba, Newfoundland, Spain, and Sweden. An average of 1.71 tons of ore was used in Pennsylvania in 1926 to make a ton of pig iron.

The iron furnaces in Tennessee used brown ore from Lyles, Tenn., hematite from the Rockwood area, Tenn., magnetite from the Cranberry mine in North Carolina, brown ore from the Bartow mine in Georgia, and manganiferous iron ore from the Cartersville district, Ga. In addition, some ores from Algeria and Sweden were used. An average of 2.033 tons of ore was used per ton of iron made in 1926.

Virginia iron furnaces used chiefly local hematite and brown ore, and some ore from France. These furnaces used 0.577 ton of cinder, scale, and scrap to a ton of pig iron, the highest average for any State. The consumption of ore per ton of iron made was 1.471 tons in 1926.

The blast furnaces at Pueblo, Colo., used brown ore from the Orient mine in Colorado, hematite from the Sunrise mine in Wyoming, magnetite from mines near Fierro, N. Mex., and manganiferous iron ores from Leadville, Colo., and Silver City, N. Mex.

The blast furnace at Provo, Utah, used some iron ore from the Iron King mine, near Eureka, Utah, but by far the greater part was obtained from the Desert Mound and Iron Springs mines in the Iron Springs district, Utah. The manganiferous iron ore used was obtained in Idaho and Nevada.

The new furnace at Everett, Mass., which was blown in on September 27, 1926, used some magnetite from Port Henry, N. Y., but the greater part of the ore used was from Africa, Canada, Spain, and Sweden.

The following two tabulations show the consumption of iron ore and other metallic materials, the production of pig iron (as reported to the Bureau of Mines), and the average quantities of materials used per ton of pig iron made.

Iron ore and other metallic materials consumed and pig iron produced in 1926, by States, in gross tons

State	Metalliferous materials consumed				Pig iron produced, exclusive of ferro-alloys	Materials consumed per ton of iron made		
	Iron and manganiferous iron ores		Cinder, scale, and scrap	Total		Ores	Cinder, scale, and scrap	Total
	Domestic	Foreign						
Alabama	6,768,013	3,715	467,408	7,239,136	2,933,796	2.308	0.159	2.467
Colorado	(1)		(1)	(1)	(1)	(1)	(1)	(1)
Illinois	6,606,414		423,299	7,029,713	3,709,065	1.781	.114	1.895
Indiana	6,570,427		605,350	7,175,777	3,672,392	1.789	.165	1.954
Kentucky	214,923		51,332	266,255	146,778	1.464	.350	1.814
Maryland		1,095,869	181,603	1,277,472	796,964	1.375	.228	1.603
Massachusetts	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Michigan	1,172,419		103,231	1,275,650	703,676	1.666	.147	1.813
Minnesota	506,922		57,966	564,888	296,446	1.710	.196	1.906
New York	4,580,319		283,345	4,863,664	2,560,527	1.789	.110	1.899
Ohio	15,605,741		1,606,116	17,211,857	9,267,747	1.684	.173	1.857
Pennsylvania	21,360,948	1,267,218	2,288,889	24,917,055	13,231,890	1.710	.173	1.883
Tennessee	190,956	3,799	18,362	213,117	95,765	2.033	.192	2.225
Utah	(1)			(1)	(1)	(1)		(1)
Virginia	122,431	2,025	48,787	173,243	84,597	1.471	.577	2.048
West Virginia	629,320		25,605	654,925	367,215	1.714	.069	1.783
Wisconsin	419,868		28,140	448,008	241,485	1.739	.116	1.855
Undistributed	[2] 1,173,900	[2] 70,005	[2] 65,090	[2] 1,308,995	[2] 647,355	[2] 1.921	[2] .101	[2] 2.022
	65,922,601	2,442,631	6,254,523	74,619,755	38,755,698	1.764	.161	1.925

[1] Included under "Undistributed."

[2] Includes figures for States entered as "(1)" above.

Iron ore and other metallic materials consumed and pig iron produced in the United States, 1917–1926, in gross tons

Year	Metalliferous materials consumed				Pig iron produced, exclusive of ferro-alloys	Materials consumed per ton of iron made			
	Iron and manganiferous iron ores		Cinder, scale, and scrap	Total		Ores		Cinder, scale, and scrap	Total
	Domestic	Foreign				Domestic	Foreign		
1917	69,108,181	749,174	5,647,723	75,505,078	37,924,490	1.822	0.020	0.149	1.991
1918	69,905,547	690,145	5,343,963	75,939,655	38,130,786	1.833	.018	.140	1.991
1919	54,950,623	520,785	3,721,448	59,192,856	30,508,122	1.801	.017	.122	1.940
1920	64,671,894	968,313	5,650,128	71,290,335	36,242,748	1.784	.027	.156	1.967
1921	28,847,395	372,038	2,269,864	31,489,297	16,403,627	1.759	.023	.138	1.920
1922	46,485,690	910,205	4,285,187	51,681,082	26,826,210	1.733	.034	.160	1.927
1923	69,272,579	2,084,094	5,376,448	76,733,121	39,767,482	1.742	.052	.135	1.929
1924	51,880,562	2,012,689	4,646,320	58,539,571	30,869,199	1.681	.065	.150	1.896
1925	62,029,734	2,337,767	5,137,068	69,504,569	36,124,678	1.717	.065	.142	1.924
1926	65,922,601	2,442,631	6,254,523	74,619,755	38,755,698	1.701	.063	.161	1.925

Foreign iron and manganiferous iron ores consumed in the manufacture of pig iron in the United States, 1925–26, by sources of ore, in gross tons

Source of ore	1925	1926	Source of ore	1925	1926
Africa	269,239	209,431	Newfoundland		10,479
Brazil	450	930	Russia	100	301
Canada		27,950	Spain	162,225	121,823
Chile	994,439	1,203,616	Sweden	285,724	190,696
Cuba	559,562	666,440	Undistributed	40,393	3,715
France	6,037	7,250			
Greece	19,598			2,337,767	2,442,631

LAKE SUPERIOR DISTRICT

PRODUCTION

The total quantity of iron ore mined in the Lake Superior district, not including the Iron Ridge area in Wisconsin, increased 10 per cent in 1926. The output of the several ranges is shown in the table that follows. After 1905 the figures do not include manganiferous iron ore containing 5 per cent or more of manganese; 1,065,419 gross tons of this ore was mined in 1926, compared with 1,321,841 tons in 1925. The Mesabi range produced 66 per cent of the iron-ore output of the Lake Superior district and 56 per cent of the total output of the United States in 1926. The proportion contributed by this range has been remarkably uniform since 1915, but was slightly more than the average in 1926. Production increased on all the iron ranges; the increase on the Cuyuna range was the largest and that on the Marquette range was the smallest.

Iron ore mined in the Lake Superior district, 1854–1926, in gross tons

[Exclusive after 1905 of ore containing 5 per cent or more of manganese]

Year	Marquette	Menominee	Gogebic	Vermilion	Mesabi	Cuyuna	Total
1854–1870	3, 971, 716	------------	------------	------------	------------	------------	3, 971, 716
1871–1880	10, 294, 047	858, 810	------------	------------	------------	------------	11, 152, 857
1881–1890	18, 598, 012	11, 917, 416	8, 657, 807	3, 260, 426	------------	------------	42, 433, 661
1891–1900	27, 269, 545	21, 639, 872	23, 361, 043	12, 097, 048	32, 282, 873	------------	116, 650, 381
1901–1910	37, 728, 143	41, 974, 789	34, 514, 899	15, 350, 581	194, 654, 902	------------	324, 223, 314
1911–1915	18, 404, 620	21, 862, 454	21, 366, 821	7, 234, 387	142, 721, 213	3, 191, 627	214, 781, 122
1916	4, 792, 987	6, 649, 578	7, 707, 101	1, 704, 440	41, 325, 341	1, 555, 641	63, 735, 088
1917	4, 638, 374	6, 366, 483	7, 881, 232	1, 481, 301	41, 127, 323	1, 986, 608	63, 481, 321
1918	3, 946, 554	6, 041, 637	7, 837, 634	1, 192, 677	39, 055, 977	1, 705, 315	59, 779, 794
1919	4, 158, 751	4, 863, 968	7, 368, 994	1, 051, 795	33, 262, 954	1, 685, 877	52, 392, 339
1920	4, 457, 609	5, 651, 542	8, 298, 206	1, 053, 518	36, 641, 880	1, 757, 775	57, 860, 530
1921	2, 204, 114	2, 147, 569	3, 135, 477	981, 576	16, 380, 190	449, 559	25, 298, 485
1922	2, 745, 626	3, 290, 641	4, 910, 789	1, 108, 764	26, 704, 601	955, 595	39, 716, 016
1923	3, 910, 909	4, 913, 541	6, 112, 662	1, 119, 113	41, 809, 018	1, 420, 165	59, 285, 408
1924	3, 579, 087	3, 780, 664	5, 579, 883	1, 141, 690	29, 818, 965	941, 430	44, 841, 719
1925	3, 813, 687	5, 009, 022	6, 377, 710	1, 331, 753	34, 851, 109	673, 382	52, 056, 663
1926	4, 046, 191	5, 445, 683	6, 949, 920	1, 568, 953	37, 997, 797	1, 134, 863	57, 143, 407
	158, 559, 972	152, 413, 669	160, 060, 178	51, 678, 022	748, 634, 143	17, 457, 837	1, 288, 803, 821

SHIPMENTS AND RECEIPTS

According to the Lake Superior Iron Ore Association, 59,970,009 gross tons of iron ore and manganiferous iron ore was shipped in 1926 from the Lake Superior district, including the Iron Ridge area in Wisconsin, as compared with 55,534,812 tons in 1925. The shipments as reported by producers to the Bureau of Mines amounted to 58,904,908 gross tons of iron ore and 1,065,419 tons of manganiferous iron ore containing 5 per cent or more of manganese, a total of 59,970,327 tons in 1926, compared with 54,216,355 tons of iron ore and 1,321,841 tons of manganiferous iron ore, a total of 55,538,196 tons in 1925.

The iron ore received at Lake Erie ports, according to the Marine Review, amounted to 43,191,577 gross tons and at Lake Michigan ports, 13,888,541 gross tons, a total of 57,080,118 tons in 1926, compared with 39,646,335 tons at Lake Erie ports and 13,291,027 tons at Lake Michigan ports, a total of 52,937,362 tons in 1925. Detailed figures of shipments and receipts by ports and by months for recent years can be found in the Marine Review.

STOCKS OF ORE AT LAKE ERIE PORTS

Stocks of iron ore at lower Lake ports at the end of the shipping season are important because of their bearing on the manufacture of pig iron during the following winter and spring. At the close of navigation in 1926, 7,662,800 gross tons of ore was in stock at Lake Erie ports, compared with 7,856,154 tons at the corresponding date in 1925.[4] At the opening of navigation in May, 1927, 4,703,294 gross tons of ore was in stock at these ports, indicating a withdrawal of 2,959,506 tons during the winter of 1926–27. The average quantity withdrawn each winter during the preceding five winters was about 3,782,000 tons. Detailed statistics concerning these stocks by ports can be found in the Marine Review.

PRICES OF LAKE SUPERIOR ORE

The price of iron ore per unit of iron in the natural state for the four standard grades of Lake Superior ore for the last 27 years is shown in the Iron Trade Review.[5] The base of Bessemer ore, old-range and Mesabi, for 1926 and 1925 is a metallic iron content of 51.5 per cent, natural, instead of 55 per cent as for 1924 and many earlier years. The base of non-Bessemer ore, old-range and Mesabi, remains as heretofore at 51.5 per cent, natural. The unit prices established March 17, 1926, are the same as those established April 4, 1925, and are as follows: Old-range Bessemer, 8.835 cents; Mesabi Bessemer, 8.544 cents; old-range non-Bessemer, 8.544 cents; Mesabi non-Bessemer, 8.252 cents. The prices per ton that correspond to these unit prices are, respectively, $4.55, $4.40, $4.40, and $4.25. The prices for 1926 and 1925 are the lowest that have been in effect since the season of 1916. The lowest prices ever quoted for these ores were $2.60 for old-range Bessemer in 1897, $2.15 for Mesabi Bessemer in 1895, $1.85 for old-range non-Bessemer in 1898, and $1.75 for Mesabi non-Bessemer in 1898.

IRON-ORE RESERVES

Estimates of ore reserves for Minnesota, furnished by the Minnesota Tax Commission, and for Michigan, furnished by the Michigan Board of State Tax Commissioners, cover developed and prospective ore in the ground and ore in stock piles. These estimates show decreases from the previous year of about 18,298,000 gross tons in Minnesota and about 4,890,000 tons in Michigan. The Gogebic range in Michigan was the only one to show an increase in 1926.

Iron-ore reserves in Minnesota May 1, 1923–1926, in gross tons

Range	1923	1924	1925	1926
Mesabi	1,254,861,451	1,275,347,126	1,250,086,347	1,233,979,351
Vermilion	13,688,352	13,169,953	13,539,256	12,382,725
Cuyuna	43,041,100	46,121,021	52,124,561	51,090,529
	1,311,590,903	1,334,638,100	1,315,750,164	1,297,452,605

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[4] Marine Review.

[5] Iron Trade Review, March 25, 1926, pp. 842–843.

Iron-ore reserves in Michigan January 1, 1924–1927, in gross tons

Range	1924	1925	1926	1927
Gogebic	54, 949, 558	51, 646, 890	52, 136, 121	53, 342, 720
Marquette	70, 384, 149	68, 978, 647	67, 160, 777	63, 612, 812
Menominee (including Iron River and Crystal Falls districts)	66, 555, 393	67, 184, 024	69, 188, 118	66, 639, 492
	191, 889, 100	187, 809, 561	188, 485, 016	183, 595, 024

IRON-ORE MINING, BY STATES

LAKE SUPERIOR DISTRICT

The outstanding features of mining developments in the Lake Superior iron mining districts are described in articles published in trade and mining journals.[6]

Michigan.—Mining activity on the Michigan iron ranges in 1926 is shown by a production of 15,248,254 gross tons, a gain of 5 per cent over 1925. This production was made by 68 mines in 5 counties, as the following table shows.

Iron ore mined in Michigan in 1926, by counties

County	Active mines	Gross tons
Baraga	1	105, 610
Dickinson	4	1, 174, 325
Gogebic	18	5, 756, 380
Iron	25	4, 271, 358
Marquette	20	3, 940, 581
	68	15, 248, 254

The ore reserves in Michigan on January 1, 1927, showed a decrease from the previous year of about 4,890,000 gross tons—evidence that new discoveries did not keep pace with production.

Only one mine in Michigan, the Norrie group, in Gogebic County, produced more than 1,000,000 tons in 1926. Of the 68 active mines in Michigan in 1926, 54 yielded more than 100,000 tons each. The average production per mine in Michigan in 1926 was 224,239 tons.

Minnesota.—Mining activity on the Minnesota iron ranges is shown by a production of 40,701,613 gross tons, a gain of 10 per cent over 1925. This output was made by 90 mines in 3 counties, as shown by the following table.

Iron ore mined in Minnesota in 1926, by counties

County	Active mines	Gross tons
Crow Wing	7	1, 134, 863
Itasca	22	7, 263, 016
St. Louis	61	32, 303, 734
	90	40, 701, 613

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[6] Hain, A. J., "Iron ore industry operating more efficiently; in stronger hands": Iron Trade Review, vol. 80, Jan. 6, 1927, pp. 57–60; Iron Age, "A slightly better year for Lake Ores": Vol. 119, Jan. 6, 1927, pp. 67–68; Woodbridge, D. E., "Lake Superior iron mining uneventful": Eng. and Min. Jour., vol. 123, Jan. 22, 1927, pp. 127–128; Skillings' Mining Review (various issues).

The reserves of iron ore in Minnesota on May 1, 1926, showed a decrease from the previous year of about 18,298,000 gross tons, indicating that exploration was not pushed, and the new ore discovered during the year apparently was not enough to keep pace with production.

The largest producing mine in Minnesota, as well as in the United States, in 1926 was the Missabe Mountain, an open-pit operation in St. Louis County, which yielded 5,676,396 gross tons. The Hull-Rust mine, also an open-pit operation in St. Louis County, which has been the leading producer of iron ore in the United States for a number of years, was the second largest producing mine in 1926 with an output of 4,537,605 gross tons. These two mines together therefore yielded about 15 per cent of the total iron ore mined in the United States in 1926. Of the 90 active mines in Minnesota in 1926, 64 yielded more than 100,000 tons each. The average production per mine in Minnesota in 1926 was 452,240 tons.

Wisconsin.—The production of iron ore in Wisconsin was 1,322,776 gross tons in 1926, an increase of 62 per cent over 1925. This output was made by six mines in two counties, as shown by the following table:

Iron ore mined in Wisconsin in 1926, by counties

County	Active mines	Gross tons
Dodge	2	129, 236
Iron	4	1, 193, 540
	6	1, 322, 776

The chief producing mine in Wisconsin in 1926 was the Montreal mine, in Iron County, which yielded 569,523 tons.

Iron-ore analyses.—The iron content of the ore shipped from the Lake Superior district in 1926 averaged 51.75 per cent, natural, which is slightly more than the average in 1925 and shows how closely these ores are graded. The contents of silica and manganese declined somewhat, but there was an increase in the content of phosphorus.

The following table, compiled by the Lake Superior Iron Ore Association, summarizes the average analyses of the total tonnages of all grades of ore shipped and shows the remarkable uniformity maintained during the last 10 years:

Average analyses of total tonnages of all grades of iron ore from all ranges of Lake Superior district, 1917–1926

Year	Gross tons	Fe (natural)	P	SiO_2	Mn	Moisture
		Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*
1917	62, 521, 465	51. 40	0. 099	8. 02	0. 76	11. 57
1918	61, 972, 871	51. 29	. 104	8. 12	. 87	11. 29
1919	46, 666, 878	51. 57	. 105	8. 04	. 73	11. 34
1920	57, 938, 428	51. 69	. 103	8. 13	. 77	11. 09
1921	22, 523, 989	52. 07	. 087	8. 23	. 62	10. 95
1922	43, 431, 294	51. 87	. 099	8. 23	. 76	10. 78
1923	60, 024, 176	51. 79	. 095	8. 22	. 79	10. 76
1924	43, 276, 165	51. 72	. 100	8. 45	. 76	10. 75
1925	54, 784, 355	51. 74	. 099	8. 42	. 82	10. 58
1926	59, 151, 368	51. 75	. 101	8. 35	. 80	10. 78

During this 10-year period the iron content ranged from 51.29 to 52.07 per cent, the phosphorus from 0.087 to 0.105 per cent, the silica from 8.02 to 8.45 per cent, the manganese from 0.62 to 0.87 per cent, and the moisture from 10.58 to 11.57 per cent. This uniformity does not, of course, indicate that the average grade of the available Lake Superior iron ore is not declining. The grade of shipments has been maintained by methods of beneficiation, which are ever becoming more elaborate, and by mixing ores from different deposits.

SOUTHEASTERN STATES

Alabama.—The production of iron ore in Alabama in 1926 amounted to 6,847,789 gross tons and was 3 per cent less than in 1925, the year of record output. This output was made by 24 mines in 8 counties, as the following table shows:

Iron ore mined in Alabama in 1926, by counties

County	Active mines	Gross tons
Blount	3	148, 429
Etowah	2	90, 534
Franklin	1	232, 530
Jefferson	8	6, 114, 917
Tuscaloosa	5	244, 871
Calhoun	1	16, 508
Cherokee	1	
Talladega	3	
	24	6, 847, 789

The ore produced in Blount County in 1926 was brown ore, all of which was washed; the iron content of the concentrates ranged from 50.5 to 52.1 per cent and averaged 50.9 per cent. The ore produced in Calhoun County in 1926 averaged 44.53 per cent of iron; that in Cherokee County averaged 48.56 per cent; and that from Talladega County averaged about 51 per cent. The brown ore concentrates from the Russellville district in Franklin County averaged about 51 per cent of iron. Tuscaloosa County was the largest producer of brown ore in Alabama in 1926; the iron content of the concentrates ranged from 45 to 48 per cent and averaged about 46 per cent.

Most of the ore mined in Alabama is hematite, much of which is nearly self-fluxing. Jefferson County is the chief producer of hematite; the iron content of that shipped in 1926 ranged from 33.32 to 39.69 per cent (natural) and averaged 36.33 per cent. Some hematite averaging 38.83 per cent of iron (natural) was shipped from the Attalla No. 1 mine in Etowah County, and the Tumlin Gap mine, also in Etowah County, yielded a small quantity of hematite in 1926.

Georgia.—The production of iron ore in Georgia in 1926 was 51,642 gross tons, a decrease of 34 per cent from 1925. This output was made by five mines in two counties, as shown by the following table:

Iron ore mined in Georgia in 1926, by counties

County	Active mines	Gross tons
Bartow	1	11,925
Polk	4	39,717
	5	51,642

All the ore shipped from Georgia in 1926 was washed brown ore; the iron content of the concentrates ranged from 47 to 53 per cent and averaged about 50 per cent. Most of this ore was mined in the Cedartown area in Polk County; the remainder was from the Cartersville district in Bartow County.

North Carolina.—The production of iron ore in North Carolina in 1926 consisted of 14,798 gross tons of magnetite, averaging 42 per cent of iron (natural), and 400 tons of brown ore, sold for use in the manufacture of paint. The output of iron ore in North Carolina in 1926 was 31 per cent less than in 1925.

Tennessee.—Tennessee, which produced both hematite and brown ore in 1926, mined 138,819 gross tons, a loss of 16 per cent from 1925. This output was made by six mines in four counties, as shown by the following table.

Iron ore mined in Tennessee in 1926, by counties

County	Active mines	Gross tons
Hickman	2	21,910
Lawrence	1	8,869
Hamilton	1	108,040
Roane	2	
	6	138,819

By far the greater part of the ore is hematite, mined near Rockwood and Kingston, Roane County. The iron content of the Rockwood ore averaged 35 per cent (natural) in 1926 and that of the Kingston ore averaged 41.6 per cent (natural). The brown ore mined in 1926 was from the Johnson and Iron Hill mines, both near Lyles, Hickman County, and from the Van Leer mine, in Lawrence County. A small amount of hematite used for paint is mined annually at a deposit near Ooltewah, Hamilton County.

Virginia.—The production of iron ore in Virginia in 1926 was 49,159 gross tons, a decrease of 49 per cent from 1925. This output consisted of 26,674 tons of brown ore concentrates averaging about 49 per cent of iron from the Porter mine in Wythe County, and 22,485 tons of hematite averaging about 41 per cent of iron (natural) from the Cloverdale mine in Botetourt County.

MISSOURI

The output of iron ore in Missouri in 1926, which amounted to 124,371 gross tons, was more than treble the production in 1925 and was the largest output since 1898. The output in 1926 consisted of 75,000 tons of hematite from the Iron Mountain mine, in St. Francois County, the iron content of the concentrates shipped averaging 55.5 per cent; 45,000 tons of hematite averaging 51 per cent of iron (natural) from the Rueppele mine in Franklin County; and 4,371 tons of washed brown ore from the Barrett mine, in Wayne County. The ore from these mines in 1926 was shipped to the blast furnaces at Granite City, Ill. The Missouri production, however, was not enough to meet the requirements of these furnaces, the larger part of the ore they consumed being obtained from the Lake Superior district. Heretofore most of the ore was shipped all-rail from the Lake Superior district to Granite City, but in 1926 much of it was shipped by water to a commercial dock at Chicago, from which it was transported by rail to Granite City.

NORTHEASTERN STATES

New Jersey.—The production of iron ore in New Jersey in 1926 was a little larger than in 1925. The Mt. Hope mine, near Wharton, Morris County, with an output of 141,005 gross tons, was the largest producer; the iron content of the magnetite concentrates averaged 60.4 per cent. The Richard mine, also near Wharton, Morris County, produced 66,754 tons of magnetite concentrates and 1,358 tons of lump ore in 1926; the concentrates averaged 60.14 per cent of iron. Some ore from stock pile of the Ahles mine, near Buttzville, Warren County, was sold for use in gas purification in 1926.

New York.—The production of iron ore in New York in 1926 was about four and one-half times as great as in 1925 and was the largest since 1920. Mining was resumed during 1926 at the New Bed, Harmony, and Old Bed mines, in Essex County, and they were the largest producers of magnetite in the State in 1926. Virtually all the ore from these mines is sintered; the iron content of that shipped in 1926 ranged from 63.38 to 64.46 per cent. The Chateaugay mine, in Clinton County, was worked on an increased scale in 1926; the magnetite concentrates shipped averaged 63.11 per cent. The Forest of Dean mine, in Orange County, was active in 1926 and shipped magnetite concentrates averaging about 62 per cent of iron. No ore was mined at No. 21 mine, in Essex County, but some magnetite concentrates that averaged about 60 per cent of iron were shipped from stock pile. New York is the largest producer of iron ore for use in paint. This ore, known as Clinton hematite, is mined in Cayuga, Oneida, and Wayne Counties.

Pennsylvania.—Pennsylvania, the largest producer of magnetite in the United States, mined 15 per cent more ore than in 1925. The production in Pennsylvania in 1926 was the largest since 1891 and reflects the increased operations at the Cornwall mine, in Lebanon County, most of the ore from which was shipped to Lebanon, Pa., where it was concentrated and sintered before being charged to the blast furnaces. The crude ore shipped from the Cornwall mine to Lebanon in 1926 averaged 41.68 per cent of iron (natural), whereas the iron content of the concentrated ore averaged 54.66 per cent. The magnetite from the French Creek mine, near St. Peters, Chester County, was shipped to Birdsboro, Pa., where it was sintered; the iron content of the sinter made in 1926 averaged 56.3 per cent. Some bog ore used in gas purification is mined in Clearfield County and some carbonate ore for use in paint is mined in Carbon County.

WESTERN STATES

Colorado.—More than four times as much brown ore was produced in Colorado in 1926 as in 1925. This ore was mined at the Orient mine, in Saguache County, and averaged (natural) 44.1 per cent of iron, 1.36 per cent of manganese, and 0.026 per cent of phosphorus.

New Mexico.—About one-fourth more iron ore, all magnetite, was mined in New Mexico in 1926 than in 1925. The ore mined in New Mexico in 1926 was from a mine near Fierro, Grant County, and averaged 51.25 per cent of iron (natural), 0.61 per cent of manganese, and 0.066 per cent of phosphorus.

Utah.—An increase of 9 per cent in the output of iron ore was recorded in Utah in 1926. The largest producing mine in 1926 was the Desert Mound, near Iron Springs, Iron County. The ore from this mine averages about 55 per cent of iron (natural) and most of it is used at the blast furnace at Provo, Utah. The Iron Springs mine, also in Iron County, was worked only 6 months in 1926 and produced 125,567 gross tons, the iron content of which averaged about 53 per cent of iron (natural). Some ore was shipped to Provo from the Iron King mine, near Eureka, and a small quantity of magnetite for use as flux was shipped from the Montreal mine, in Beaver County, in 1926.

Wyoming.—Mining operations in Wyoming were on an increased scale in 1926, the output of 630,387 tons representing a gain of 29 per cent and being the largest since 1910. The output in 1926 was from the Sunrise mine, in Platte County. The ore is hematite; it averaged 56.7 per cent of iron (natural), 0.152 per cent of manganese, and 0.05 per cent of phosphorus.

FOREIGN TRADE IN IRON ORE

IMPORTS AND EXPORTS

The iron ore imported into the United States in 1926 increased 17 per cent in quantity but decreased 15 per cent in total value as compared with 1925. The average value was $2.30 a ton in 1926 and $3.15 in 1925. Chile and Cuba were the chief sources of imports in 1926, these two countries furnishing 74 per cent of the total. The other main sources of imported ore in 1926 were Africa, Newfoundland and Labrador, Spain, and Sweden; 23 per cent of the total came from these countries.

Iron ore imported into the United States, 1924–1926

Country	1924		1925		1926	
	Gross tons	Value	Gross tons	Value	Gross tons	Value
Africa:						
French—						
Algeria and Tunisia	192, 814	$546, 803	173, 070	$512, 563	320, 134	$997, 592
Morocco					5, 540	20, 000
Other					1, 611	20, 943
Portuguese East			3, 000	19, 834		
Australia			140	758		
Belgium	12	75	300	1, 695	55	139
Brazil	206	3, 058	600	7, 157	3, 708	53, 447
Canada	4, 122	15, 705	7, 829	21, 547	16, 984	59, 831
Chile	1, 144, 775	7, 479, 683	1, 113, 900	3, 221, 605	1, 364, 400	1, 561, 303
China	10	35				
Colombia	6, 700	20, 100				
Cuba	285, 288	1, 141, 155	546, 130	2, 074, 882	539, 000	2, 005, 112
Denmark	7	114				
Dominican Republic	(1)	2				
Egypt	900	21, 288	9, 950	26, 632	6, 550	36, 555
France	483	11, 418	6, 345	15, 688	8, 279	64, 866
Germany	12, 776	57, 070	15, 915	61, 076	10, 640	40, 888
Greece	8, 000	14, 230	17, 375	28, 046		
Italy					20	318
Japan	5	136				
Mexico	(1)	5				
Netherlands	2, 200	6, 692	1, 770	5, 743		
Newfoundland and Labrador					119, 544	455, 188
Norway	(2)	25			18, 313	65, 167
Portugal					900	14, 856
Spain	70, 645	179, 875	144, 421	333, 126	83, 608	235, 636
Sweden	317, 742	1, 074, 672	149, 238	557, 309	53, 605	214, 917
Turkey in Europe					445	1, 187
United Kingdom	370	8, 763	714	7, 568	105	4, 371
Virgin Islands of the United States					2, 000	24, 000
	2, 047, 055	10, 580, 904	2, 190, 697	6, 895, 229	2, 555, 441	5, 876, 316

[1] Less than 1 ton.

[2] Not recorded.

Iron ore imported into the United States, 1872–1926

Year	Gross tons	Year	Gross tons
1872–1880	1, 188, 267	1920	1, 273, 456
1881–1890	7, 663, 630	1921	315, 768
1891–1900	5, 869, 757	1922	1, 135, 156
1901–1910	11, 798, 568	1923	2, 768, 430
1911–1915	9, 202, 947	1924	2, 047, 055
1916	1, 325, 736	1925	2, 190, 697
1917	971, 663	1926	2, 555, 441
1918	787, 468		
1919	476, 461		51, 570, 500

Exports of iron ore from the United States in 1926 amounted to 868,710 gross tons, valued at $3,380,701, or $3.89 a ton, as compared with 630,521 tons, valued at $2,411,093, or $3.82 a ton, in 1925. These figures represent an increase in 1926 of 38 per cent in quantity and 40 per cent in total value. Except for 18 tons to Venezuela, all the ore exported in 1926 went to Canada.

Iron ore exported from the United States, 1899–1926

Year	Gross tons	Year	Gross tons
1899–1900	92, 125	1921	440, 106
1901–1910	2, 713, 397	1922	602, 194
1911–1915	4, 265, 538	1923	1, 116, 932
1916	1, 183, 952	1924	595, 413
1917	1, 132, 313	1925	630, 521
1918	1, 256, 383	1926	868, 710
1919	996, 569		
1920	1, 145, 037		17, 039, 190

IRON-ORE MINING IN CUBA

The iron ore shipped from Cuba to the United States in 1926 amounted to 578,091 gross tons, valued at $2,089,163, as compared with 558,167 tons, valued at $1,909,916, in 1925—an increase of 4 per cent in quantity and of 9 per cent in total value. The average value of the ore was $3.61 a ton in 1926; in 1925 it was $3.42. The shipments in 1926 were 91 per cent of hematite, including a little magnetite, from the Daiquiri and Juragua mines on the southern coast, and 9 per cent of brown ore from the Mayari mines near the northern coast. In 1926 the hematite, dried at 212° F., contained 60.13 per cent of iron, whereas the brown ore carried 54.77 per cent (natural) and 55.98 per cent (nodulized). In 1925 the hematite (dried) averaged 58.77 per cent, whereas the brown ore averaged 52.20 per cent (natural) and 54.07 per cent (nodulized).

The total stock of ore (natural and nodulized) reported on hand at the end of 1926 was 849,732 gross tons, compared with 923,431 tons at the end of 1925—a decrease of 8 per cent.

The following table shows the shipments of iron ore from Cuba since the opening of the mines in 1884. The statistics of the shipments of Cuban iron ore are collected by the Bureau of Mines.

Iron ore shipped from mines in the Province of Oriente, Cuba, 1884–1926, in gross tons

Year	Juragua (hematite and magnetite)	Sigua (hematite)	Daiquiri (hematite and a little magnetite)	Mayari (brown ore)	Guamá (hematite)	El Cuero (hematite)	Total
1884–1890	1, 142, 519						1, 142, 519
1891–1900	[1] 2, 348, 473	20, 438	[2] 979, 992				3, 348, 903
1901–1910	2, 104, 186		[3] 4, 456, 440	307, 700	41, 241	224, 729	7, 134, 296
1911–1915	1, 567, 112		1, 837, 669	1, 855, 525		532, 194	5, 792, 500
1916	212, 013		181, 602	258, 451		60, 650	712, 716
1917	39, 784		181, 028	287, 904		44, 769	553, 485
1918	17, 128		353, 103	232, 540		40, 761	643, 532
1919			279, 700	78, 080			357, 780
1920	([4])		[4] 561, 268	321, 515			882, 783
1921	([4])		[4] 130, 359				130, 359
1922	([4])		[4] 444, 794				444, 794
1923	([4])		[4] 674, 371				674, 371
1924	([4])		[4] 283, 094	11, 461			294, 555
1925	([4])		[4] 514, 040	44, 127			558, 167
1926	([4])		[4] 528, 647	49, 444			578, 091
	[4] 7, 431, 215	20, 438	[4] 11,406, 107	3, 446, 747	41, 241	903, 103	23, 248, 851

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[1] Of this quantity, 5,932 tons was sent to Pictou, Nova Scotia.

[2] Of this quantity, 51,537 tons was sent to ports outside of the United States.

[3] Of this quantity, 12,691 tons was sent to ports outside of the United States.

[4] Shipments of Juragua mines, 1920–1926, included with Daiquiri mines.

PRODUCTION OF IRON ORE, BY COUNTRIES

The following table, compiled by L. M. Jones, of the Bureau of Mines, shows the production of iron ore by countries for 1922 to 1926, so far as figures are obtainable. Figures for preceding years appear in earlier volumes of Mineral Resources. Complete returns for 1926 are not available, but those for 1925 and earlier years are fairly complete. Thus the figures for 1925 indicate a total world's production of about 151,000,000 metric tons, of which the United States furnished about 42 per cent. In 1924, also, the United States contributed about 42 per cent of the world's total, which apparently was about 130,000,000 metric tons.

Iron ore produced, 1922–1926, by countries, in metric tons

Country	1922	1923	1924	1925	1926
North America:					
Canada [1] [2]	16,303	27,904	1,343	------------	------------
Cuba [1]	451,933	685,195	299,283	567,126	587,369
Mexico	(3)	50,694	52,448	46,000	33,113
Newfoundland	1,014,490	936,369	665,633	914,654	855,077
United States	47,884,940	70,464,533	55,138,411	62,901,620	68,708,349
South America:					
Brazil (exports)	------------	350	------------	30,000	30,000
Chile [4]	222,947	679,187	987,969	1,334,288	1,476,355
Europe:					
Austria	1,112,415	1,211,065	713,805	1,030,364	1,094,372
Belgium	71,250	117,090	154,970	165,650	(3)
Czechoslovakia	313,149	675,185	1,173,935	1,229,254	1,419,108
Finland	1,187	1,000	(3)	226	------------
France	21,106,112	23,349,379	29,044,149	35,597,704	39,480,400
Germany [5]	5,794,688	5,014,107	4,284,789	5,742,542	(3)
Great Britain [6]	6,946,233	11,049,758	11,227,951	10,305,671	4,160,101
Greece	49,272	100,115	99,787	99,759	(3)
Hungary	45,909	138,123	101,750	68,517	131,762
Italy	311,214	340,831	218,726	495,905	504,556
Luxemburg	4,488,974	4,097,549	5,333,580	6,672,092	7,756,240
Norway	258,815	385,836	522,124	425,424	(3)
Poland	352,531	450,175	289,281	211,987	314,600
Portugal	18,292	9,145	8,573	2,000	(3)
Rumania	94,607	99,293	102,537	107,384	(3)
Russia	220,775	493,376	[7] 947,335	[7] [8] 2,206,759	[7] 3,259,000
Spain	2,771,888	3,456,233	4,612,817	4,442,872	3,181,589
Sweden	6,201,243	5,588,173	6,499,730	8,168,546	8,465,914
Switzerland	58,823	76,000	[9] 81,375	[9] 59,513	(3)
Yugoslavia	35,645	244,619	330,119	139,137	366,624
Asia:					
China	1,370,751	1,400,820	1,100,000	1,519,000	(3)
Chosen	185,560	243,279	309,443	351,444	(3)
India, British	635,310	834,231	1,468,510	1,569,368	(3)
Japan	(3)	55,000	57,000	(3)	(3)
Unfederated Malay States: Johore	113,154	156,635	238,892	276,358	(3)
Africa:					
Algeria	1,045,816	1,452,563	1,662,506	1,780,842	1,629,425
Belgian Congo	71,305	105,756	105,195	87,258	113,511
Madagascar	24	31	(3)	6	(3)
Morocco, Spanish	300,000	397,000	(3)	800,000	(3)
Rhodesia, Southern	------------	------------	------------	1,063	1,923
Southwest African Protectorate	(3)	(3)	5,835	14,161	(3)
Tunisia	496,762	845,000	797,680	724,000	582,000
Union of South Africa [1]	1,913	521	------------	------------	47,200
Oceania:					
Australia—					
New South Wales [2]	113,749	178,549	142,852	157,735	159,788
Queensland	------------	203	------------	351	4,483
South Australia	52,248	390,604	589,622	596,068	593,114
New Zealand	(3)	(3)	2,550	2,620	(3)

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[1] Shipments.
[2] Exclusive of iron oxide used for paint.
[3] Data not available.
[4] From Tofo mine.
[5] Exclusive of manganiferous iron ore carrying 12 to 30 per cent of manganese.
[6] Exclusive of bog ore, which is used mainly for the purification of gas.
[7] Year ended Sept. 30.
[8] Includes small quantity produced in Siberia.
[9] Exports.

BENEFICIATED IRON ORE

In 1926 the processes reported in use to improve the quality of the ore at the mines were crushing and screening, drying, hand picking, washing, jigging, electromagnetic separation, sintering, nodulizing, and desulphurization by sintering. Some operators combined two or more of these processes. Beneficiation of iron ore was reported at 63 mines in 11 States in 1926 and at 62 mines in 11 States in 1925. Some iron ore is also recovered in the form of dust from blast furnaces, but no statistics on it have been gathered. Ore so recovered, however, has been originally included in the statistics of shipments from the mines.

Beneficiated ore shipped from mines in the United States in 1926 decreased 4 per cent in quantity and 0.2 per cent in total value as compared with 1925. Such figures as are available in 1926 to show the relation between crude ore treated and beneficiated ore recovered indicate that in washing brown ore the ratios, by weight, of crude ore washed to resultant concentrates range from 6 : 1 to 2 : 1; in concentrating hematite, from 3 : 1 to 1.005 : 1; in concentrating magnetite, from 2.88 : 1 to 1.023 : 1; and in concentrating carbonate, 1.333 : 1.

The quantity of crude ore beneficiated in the Lake Superior district in 1926 amounted to 8,626,995 gross tons, and the beneficiated ore recovered was 5,489,286 tons—a loss of 3,137,709 tons, and a ratio of 1.572 : 1. In 1925 the crude Lake ore treated amounted to 9,814,448 tons and the beneficiated ore recovered therefrom was 6,408,946 tons—a loss of 3,405,502 tons and a ratio of 1.531 : 1.

Beneficiated iron ore shipped from mines in the United States, 1925–26

[Exclusive of ore containing 5 per cent or more of manganese and of ore sold for paint]

State	Variety	1925		1926	
		Gross tons	Value	Gross tons	Value
Alabama	Hematite, brown ore	755, 189	$2, 069, 514	633, 692	$1, 738, 696
Georgia	Brown ore	67, 217	204, 480	51, 642	149, 198
Minnesota	Hematite	6, 410, 362	15, 617, 011	5, 439, 499	13, 223, 658
Missouri	Hematite, brown ore	3, 878	(1)	79, 371	(1)
New Jersey	Magnetite	162, 451	665, 979	208, 329	(1)
New Mexico	do			216, 269	(1)
New York	do	393, 299	1, 917, 622	659, 741	3, 015, 586
North Carolina	Brown ore	5, 753	(1)		
Pennsylvania	Magnetite	662, 744	(1)	808, 062	3, 267, 827
Tennessee	Hematite, brown ore	138, 432	332, 276	116, 175	272, 846
Virginia	do	30, 536	(1)	49, 703	162, 446
Wisconsin	Hematite	105, 811	(1)	109, 346	(1)
Undistributed			3, 176, 215		2, 102, 577
		8, 735, 672	23, 983, 097	8, 371, 829	23, 932, 834

[1] Included under "Undistributed."

The next table gives the shipments of beneficiated iron ore beginning with 1914, the first year for which statistics were gathered, and the percentage of beneficiated ore to the total ore shipped. Except for a few years, the increase in the proportion of beneficiated ore has been slow but steady. During the five-year period 1914 to 1918 the shipments of beneficiated ore averaged 10.6 per cent of the total ore and increased to 13.5 per cent during the next five-year period (1919 to 1923); in 1924 and 1925 there was a fractional increase each year over the average for 1919 to 1923, but in 1926 the shipments of beneficiated ore were only 12.1 per cent of the total ore shipped. Minnesota has contributed more than 64 per cent of the total shipments of beneficiated ore during the period 1914 to 1926. During the five-year period 1914 to 1918 an average of 10.2 per cent of the total shipments from Minnesota was beneficiated ore; during the five-year period 1919 to 1923 the proportion was 14.9 per cent; in 1924 and 1925 it rose to 16.5 and 16.9 per cent, respectively, but in 1926 it declined to 13.3 per cent.

Iron ore shipped from mines in the United States, 1914–1926, in gross tons, and percentage of beneficiated ore to the total shipped

[Exclusive of ore containing 5 per cent or more of manganese and of ore sold for paint]

Year	Beneficiated	Total	Percentage of beneficiated to total	Year	Beneficiated	Total	Percentage of beneficiated to total
1914	4, 130, 298	39, 714, 280	10. 4	1921	3, 727, 621	26, 652, 528	14. 0
1915	5, 581, 029	55, 493, 100	10. 1	1922	6, 623, 144	50, 612, 620	13. 1
1916	8, 105, 011	77, 870, 553	10. 4	1923	10, 686, 992	69, 811, 472	15. 3
1917	8, 166, 564	75, 573, 207	10. 8	1924	7, 092, 539	52, 083, 375	13. 6
1918	7, 881, 570	72, 021, 202	10. 9	1925	8, 735, 672	63, 924, 763	13. 7
1919	7, 355, 934	56, 372, 784	13. 0	1926	8, 371, 829	69, 292, 832	12. 1
1920	8, 514, 838	69, 281, 341	12. 3				

IRON AND STEEL

The records of the production and sales of iron and steel shown in the following pages are derived in part from producers who report directly to the Bureau of Mines and in part from several other authoritative sources, such as the American Iron and Steel Institute, Metal Statistics, the Iron Age, and the Iron Trade Review. The statistics on imports and exports are from the Bureau of Foreign and Domestic Commerce.

PIG IRON

SHIPMENTS, VALUE, AND PRODUCTION, BY STATES

The shipments of pig iron, exclusive of ferro-alloys, reported by the manufacturers to the Bureau of Mines, represent an increase of 3.7 per cent in quantity and 1.4 per cent in total value as compared with 1925. The values given represent the approximate amounts received for the iron f. o. b. furnaces and do not include freight costs, selling commissions, and other items that are figured in some of the market prices of pig iron as published in trade journals.

The pig iron shipped includes metal produced from foreign as well as from domestic ore. The pig iron made from ore imported from Africa, Brazil, Canada, Chile, Cuba, France, Newfoundland, Russia, Spain, and Sweden, although it constitutes a very small percentage of the total production, amounted in 1926 to 1,423,035 gross tons, valued at $29,020,535, as compared with 1,436,564 tons, valued at $29,558,486, in 1925. In the manufacture during 1926 of 1,454,307 gross tons of pig iron, 2,442,631 gross tons of foreign iron ore and 7,947 tons of cinder derived from foreign pyrite were reported to have been used, indicating an average pig-iron yield of 59.35 per cent from imported materials. Domestic ore and 6,246,576 gross tons of cinder, scale, and scrap, amounting in all to 72,169,177 gross tons, were reported used in making 37,301,391 tons of pig iron, indicating an average pig-iron yield of 51.69 per cent from domestic materials. The total production of pig iron, exclusive of ferro-alloys, reported to the Bureau of Mines, was 38,755,698 gross tons, compared with 36,124,678 tons in 1925, an increase of 7 per cent.

Pig iron shipped from blast furnaces in the United States, 1925–26, by States

State	1925		1926			
	Gross tons	Value	Gross tons	Value	Percentage of increase or decrease	
					Quantity	Value
Alabama	2,910,370	$57,777,275	2,875,534	$58,119,260	−1.2	+0.6
Colorado	(1)	(1)	(1)	(1)	----------	----------
Illinois	3,600,484	74,937,781	3,626,330	73,460,392	+.7	−2.0
Indiana	3,350,747	64,807,575	3,670,478	69,292,329	+9.5	+6.9
Kentucky	153,935	(1)	148,053	(1)	−3.8	----------
Maryland	693,523	(1)	791,637	(1)	+14.1	----------
Massachusetts	----------	----------	23,130	(1)	----------	----------
Michigan	831,435	18,452,346	638,282	13,180,113	−23.2	−28.6
Minnesota	276,240	(1)	292,658	(1)	+5.9	----------
Missouri	3,758	(1)	----------	----------	−100.0	−100.0
New Jersey	(1)	(1)	(1)	(1)	----------	----------
New York	2,151,036	40,435,443	2,389,665	44,970,196	+11.1	+11.2
Ohio	8,857,615	173,418,068	9,177,127	176,433,401	+3.6	+1.7
Pennsylvania	12,537,809	258,140,674	13,142,528	263,238,184	+4.8	+2.0
Tennessee	95,186	2,014,176	113,029	2,544,825	+18.7	+26.3
Utah	126,746	(1)	(1)	(1)	----------	----------
Virginia	97,884	2,237,749	105,019	2,322,451	+7.3	+3.8
West Virginia	499,047	9,416,095	364,302	(1)	−27.0	----------
Wisconsin	226,712	4,836,952	235,597	5,034,012	+3.9	+4.1
Undistributed	[2] 402,175	[2] 32,842,199	[2] 587,684	[2] 41,038,305	----------	----------
	36,814,702	739,316,333	38,181,053	749,633,468	+3.7	+1.4

[1] Included under "Undistributed."

[2] Includes figures for States entered as "(1)" above.

Pig iron shipped from blast furnaces in the United States, 1925–26, by grades

Grade	1925			1926		
	Gross tons	Value		Gross tons	Value	
		Total	Average		Total	Average
Charcoal	186,579	$4,964,071	$26.61	157,232	$4,187,292	$26.63
Foundry	5,434,997	108,843,269	20.03	5,099,697	100,934,853	19.79
Basic	20,192,364	396,133,274	19.62	21,345,155	407,801,968	19.11
Bessemer	8,933,388	186,846,630	20.92	9,355,671	191,896,308	20.51
Low-phosphorus	207,788	5,031,833	24.22	283,898	6,679,787	23.53
Malleable	1,517,573	29,853,240	19.67	1,619,990	31,238,844	19.28
Forge	231,606	4,827,547	20.84	191,274	3,965,143	20.73
All other (not ferro-alloys)	110,407	2,816,469	25.51	128,136	2,929,273	22.86
	36,814,702	739,316,333	20.08	38,181,053	749,633,468	19.63

Pig iron shipped from blast furnaces in the United States, 1910–1926

Year	Gross tons	Value	Year	Gross tons	Value
1910	26,674,123	$412,162,486	1919	30,130,231	$775,915,043
1911	23,257,288	327,334,624	1920	35,710,227	1,140,904,096
1912	30,180,969	420,563,388	1921	16,038,619	389,437,792
1913	30,388,935	458,342,345	1922	27,670,738	608,144,858
1914	22,263,263	298,777,429	1923	38,361,379	946,799,378
1915	30,384,486	401,409,604	1924	31,064,129	665,078,972
1916	39,126,324	663,478,118	1925	36,814,702	739,316.333
1917	38,612,546	1,053,785,975	1926	38,181,053	749,633,468
1918	38,230,440	1,180,759,565			

The American Iron and Steel Institute reports that in 1926 the output of all kinds of pig iron and ferro-alloys increased 2,672,163 gross tons, or 7 per cent as compared with 1925.

Pig iron, including ferro-alloys, manufactured in the United States, 1925–26, in gross tons [1]

State	1925	1926	State	1925	1926
Pennsylvania	12,523,485	13,587,881	West Virginia Kentucky	651,983	516,094
Ohio	8,862,646	9,359,275	Missouri Iowa Colorado Utah	505,217	633,864
Illinois	3,604,255	3,659,974	Maryland	705,377	805,373
Alabama	2,836,023	2,953,294	Tennessee	110,232	110,146
Indiana Michigan	4,119,811	4,377,068	Virginia	125,325	103,000
New York New Jersey Massachusetts [2]	2,187,733	2,729,261			
Wisconsin Minnesota	468,479	537,499		36,700,566	39,372,729

[1] American Iron and Steel Institute.

[2] No production from Massachusetts in 1925.

AVERAGE VALUES

Values at blast furnaces.—The average value of all kinds of pig iron given in the accompanying table is based on the reports of the manufacturers to the Bureau of Mines. The figures represent the approximate values f. o. b. at the blast furnaces and do not include the values of ferro-alloys. The general average value for all grades of pig iron at the furnaces, exclusive of ferro-alloys, decreased 2 per cent in 1926 and was the lowest for any year since 1916.

Average value per gross ton of pig iron at blast furnaces in the United States, 1921–1926

State	1921	1922	1923	1924	1925	1926
Alabama	$24.33	$19.29	$19.72	$20.92	$19.85	$20.21
Illinois	24.50	21.60	25.36	22.00	20.81	20.26
Indiana	22.32	19.65	23.26	20.42	19.34	18.88
Kentucky	28.77	21.05	(1)	(1)	(1)	(1)
Michigan	29.64	24.83	26.25	23.41	22.19	20.65
Missouri	28.19	(1)	(1)	(1)	(1)	----------
New York	23.15	22.11	23.71	19.93	18.80	18.82
Ohio	24.24	22.17	24.76	21.48	19.58	19.23
Pennsylvania	24.43	22.77	25.02	21.62	20.59	20.03
Tennessee	27.12	21.65	26.95	21.97	21.16	22.51
Virginia	30.24	25.59	26.76	24.01	22.86	22.11
West Virginia	25.29	24.32	24.68	21.77	18.87	(1)
Wisconsin	29.15	23.75	25.90	22.88	21.34	21.37
Other States [2]	25.50	22.11	24.73	21.57	19.83	18.59
Average for United States	24.28	21.98	24.68	21.41	20.08	19.63

[1] Included under "Other States."

[2] 1921: Colorado, Connecticut, Maryland, Massachusetts, Minnesota, and New Jersey; 1922: Colorado, Connecticut, Maryland, Massachusetts, Minnesota, Missouri, and New Jersey; 1923: Colorado, Kentucky, Maryland, Massachusetts, Minnesota, Missouri, and New Jersey; 1924: Colorado, Kentucky, Maryland, Massachusetts, Minnesota, Missouri, New Jersey, and Utah; 1925: Colorado, Kentucky, Maryland, Minnesota, Missouri, New Jersey, and Utah; 1926: Colorado, Kentucky, Maryland, Massachusetts, Minnesota, New Jersey, Utah, and West Virginia.

Average value per gross ton of pig iron at blast furnaces in the United States, 1889–1926

Year	Value	Year	Value
1889	$15.78	1908	$15.96
1890	16.43	1909	16.25
1891	15.50	1910	15.45
1892	14.32	1911	14.07
1893	11.90	1912	13.93
1894	9.76	1913	15.08
1895	11.14	1914	13.42
1896	10.47	1915	13.21
1897	9.85	1916	16.96
1898	9.90	1917	27.29
1899	18.00	1918	30.89
1900	18.85	1919	25.75
1901	15.25	1920	31.95
1902	20.92	1921	24.28
1903	19.12	1922	21.98
1904	14.13	1923	24.68
1905	16.63	1924	21.41
1906	19.98	1925	20.08
1907	20.56	1926	19.63

Commercial quotations.—The average monthly prices, according to published market quotations, of the chief grades of pig iron at the blast furnaces or at nearest market during 1925 and 1926 are summarized in the following table for comparison with preceding tables giving the figures reported by blast-furnace operators. The average commercial quotations for three of the four grades of iron show a decrease and are lower than the average values reported by manufacturers, but the reader should remember that the manufacturers' values represent weighted averages of what was actually received for the metal, and a discrepancy between the two sets of figures is to be expected.

Average monthly prices per ton of chief grades of pig iron, 1925–26 [1]

Month	Foundry pig iron at Valley furnaces		Foundry pig iron at Birmingham furnaces		Bessemer pig iron at Valley furnaces		Basic pig iron at Valley furnaces	
	1925	1926	1925	1926	1925	1926	1925	1926
January	$22.00	$20.50	$20.00	$22.00	$22.73	$21.00	$21.73	$20.00
February	22.00	20.50	20.00	21.79	22.71	21.00	21.94	20.00
March	21.15	20.50	20.25	21.78	22.23	21.00	21.12	20.00
April	20.50	19.29	19.89	22.00	21.38	19.90	20.25	18.90
May	19.40	19.00	19.88	22.00	20.26	19.50	19.26	18.50
June	18.35	18.04	18.38	21.83	19.12	19.02	18.12	18.02
July	18.50	17.73	17.33	20.50	19.00	18.81	18.00	17.52
August	18.50	17.50	18.06	20.50	19.00	18.40	18.00	17.50
September	18.74	17.54	18.58	20.44	19.24	18.16	18.24	17.50
October	19.07	18.21	19.41	20.00	19.57	19.12	18.57	17.71
November	20.32	19.00	21.00	20.00	20.82	19.76	19.82	18.50
December	20.50	18.77	22.00	20.00	21.00	19.96	20.00	18.50
Average	19.92	18.88	19.57	21.07	20.59	19.64	19.59	18.55

[1] Metal Statistics, 1927.

PRODUCTION BY GRADES AND BY FUEL USED, TOTAL PRODUCTION, AND BLAST FURNACES

The statistics of production of pig iron by grades and by fuel used for 1922 to 1926, the total output of pig iron, and the number of furnaces in blast in 1925 and 1926 have been published by the American Iron and Steel Institute as follows. These figures include ferro-alloys. Metals produced by the use of electricity and by the use of coke and electricity together are included in coke pig iron.

Pig iron, including ferro-alloys, manufactured in the United States, 1922–1926, by grades, in gross tons

Grade	1922	1923	1924	1925	1926
Bessemer and low-phosphorus	7, 813, 203	11, 677, 509	8, 172, 297	9, 419, 461	10, 042, 324
Basic	13, 841, 367	19, 795, 590	15, 999, 012	19, 667, 380	21, 168, 407
Forge	214, 210	327, 430	255, 961	240, 652	216, 277
Foundry and ferrosilicon	3, 976, 431	6, 470, 013	5, 623, 124	5, 410, 217	5, 752, 573
Malleable	1, 051, 495	1, 571, 064	973, 158	1, 553, 636	1, 681, 897
Spiegeleisen	73, 443	129, 686	107, 066	65, 755	76, 215
Ferromanganese	150, 115	247, 031	194, 243	260, 029	318, 891
White, mottled, direct castings, etc	99, 640	142, 823	80, 929	83, 436	116, 145
	27, 219, 904	40, 361, 146	31, 405, 790	36, 700, 566	39, 372, 729

Pig iron, including ferro-alloys, manufactured in the United States, 1922–1926, by fuel used, in gross tons

Fuel used	1922	1923	1924	1925	1926
Bituminous, chiefly coke	26, 995, 173	40, 097, 239	31, 193, 080	36, 504, 402	39, 208, 849
Anthracite and coke	----------	12, 730	----------	----------	----------
Charcoal	224, 731	251, 177	212, 710	196, 164	163, 880
	27, 219, 904	40, 361, 146	31, 405, 790	36, 700, 566	39, 372, 729

The next table shows the production in the United States of pig iron, including ferro-alloys, so far as it has been recorded. Statistics by years prior to 1916 will be found in Mineral Resources for 1918 and earlier years.

Pig iron, including ferro-alloys, manufactured in the United States, 1810–1926

Year	Gross tons	Year	Gross tons
1810–1860	10, 542, 548	1919	31, 015, 364
1861–1870	11, 366, 963	1920	36, 925, 987
1871–1880	24, 055, 278	1921	16, 688, 126
1881–1890	56, 902, 041	1922	27, 219, 904
1891–1900	98, 124, 754	1923	40, 361, 146
1901–1910	211, 321, 934	1924	31, 405, 790
1911–1915	137, 591, 093	1925	36, 700, 566
1916	39, 434, 797	1926	39, 372, 729
1917	38, 621, 216		
1918	39, 054, 644		926, 704, 880

The number of furnaces in blast on June 30 and December 31 and the total number of stacks recorded for 1925 and 1926, exclusive of electric reduction furnaces, were as follows:

Blast furnaces in the United States, 1925 and 1926

State	In blast June 30, 1925	Dec. 31, 1925			In blast June 30, 1926	Dec. 31, 1926		
		In	Out	Total		In	Out	Total
Alabama	24	27	11	38	24	21	14	35
Colorado	3	3	2	5	2	3	2	5
Illinois	15	16	9	25	17	15	11	26
Indiana	14	16	1	17	17	13	5	18
Kentucky	1	2	5	7	1	1	3	4
Maryland	4	5	1	6	5	5	1	6
Massachusetts						1		1
Michigan	10	9	3	12	9	10	1	11
Minnesota	2	2	1	3	2	2	1	3
Mississippi			1	1			1	1
Missouri			3	3			3	3
New Jersey			4	4			3	3
New York	10	17	10	27	15	16	10	26
Ohio	46	48	21	69	50	44	25	69
Pennsylvania	60	84	51	135	74	70	54	124
Tennessee	2	3	11	14	1	2	12	14
Texas			1	1			1	1
Utah	1	1		1	1	1		1
Virginia	2	1	16	17	2	2	15	17
West Virginia	3	2	2	4	2	3	2	5
Wisconsin	1	2	4	6	2	1	5	6
	198	238	157	395	224	210	169	379

FOREIGN TRADE IN PIG IRON

Imports of pig iron into the United States during 1926 increased nearly 1 per cent in quantity but decreased 3 per cent in total value, as compared in 1925. Germany, which contributed 35 per cent of the total, was the chief source of imported pig iron in 1926; imports from India, the chief source in 1925, decreased 55 per cent in 1926.

Pig iron imported into the United States, 1922–1926, by countries, in gross tons

Country	1922	1923	1924	1925	1926
North America:					
Canada	17, 836	54, 076	15, 933	6, 455	4, 767
Dominican Republic				3	
Honduras			200		
Mexico		1			70
Panama	141				
Europe:					
Austria		299			
Belgium	64, 449	14, 980	3, 019	11, 068	7, 488
France	41, 704	57, 722	23, 208	9, 814	28, 449
Germany	4, 085	20, 740	11, 228	75, 052	157, 094
Ireland			50		
Netherlands	2, 537		23, 857	54, 904	69, 054
Norway					2
Sweden	408	705	700	2, 169	3, 455
United Kingdom—					
England	152, 833	179, 937	52, 593	96, 869	92, 083
Scotland	98, 950	18, 201	4, 546		
Asia:					
China	502	3, 129	2, 375	200	
India, British		17, 988	71, 370	184, 325	83, 311
Japan				(1)	
Kwantung			30	566	
	383, 445	367, 778	209, 109	441, 425	445, 773
Value	$8, 670, 860	$9, 005, 077	$3, 741, 213	$7, 951, 283	$7, 708, 982

[1] Less than 1 ton.

Pig iron [1] imported into the United States, 1917–1926

Year	Gross tons	Value	Year	Gross tons	Value
1917 [1]	76,786	$7,872,105	1922	383,445	$8,670,860
1918 [1]	34,711	4,968,056	1923	367,778	9,005,077
1919 [1]	101,665	6,565,106	1924	209,109	3,741,213
1920 [1]	185,944	12,801,834	1925	441,425	7,951,283
1921 [1]	44,036	2,014,926	1926	445,773	7,708,982

[1] Figures for 1917 to 1921, inclusive, include ferro-alloys. Separate data not available prior to 1922.

Exports of pig iron from the United States decreased 23 per cent in quantity and 28 per cent in total value in 1926, as compared with 1925. Canada was the best customer in 1926, taking 72 per cent of the total exports. The average value was $20.78 a ton in 1926, as compared with $22.18 a ton in 1925.

Pig iron exported from the United States, 1925–26, by countries, in gross tons

Country	1925	1926	Country	1925	1926
North America:			Europe—Continued		
Canada	20,081	18,217	Germany	680	185
Cuba	357	818	Italy	11	26
Mexico	387	204	Norway	10	----------
Panama	383	422	United Kingdom	8,209	3,761
Other countries	161	69	Other countries	----------	23
South America:			Asia:		
Chile	456	469	China	65	10
Colombia	424	146	Japan including Chosen	105	51
Peru	206	478	Java and Madura	39	----------
Other countries	37	11	Philippine Islands	662	50
Europe:					
Belgium	391	253		32,674	25,208
France	10	15	Value	$724,565	$523,883

Pig iron [1] exported from the United States, 1917–1926

Year	Gross tons	Value	Year	Gross tons	Value
1917 [1]	656,220	$24,037,051	1922	30,920	$756,842
1918 [1]	269,575	11,576,721	1923	32,318	862,443
1919 [1]	321,261	12,313,183	1924	41,483	957,921
1920 [1]	216,828	10,074,377	1925	32,674	724,565
1921 [1]	28,307	933,093	1926	25,208	523,883

[1] Figures for 1917 to 1921, inclusive, include ferro-alloys. Separate data not available prior to 1922.

PRODUCTION BY COUNTRIES

The accompanying table, compiled by L. M. Jones, of the Bureau of Mines, shows the predominance of the United States in the manufacture of pig iron, and with the table giving exports from the United States indicates that the consumption in the principal European countries is still comparatively small.

Pig iron (including ferro-alloys) produced, 1922–1926, by countries, in metric tons

Country	1922	1923	1924	1925	1926
Australia	84,874	335,096	422,728	446,472	445,739
Austria	320,928	341,875	266,463	379,921	331,636
Belgium	1,613,160	2,147,950	2,843,920	2,542,507	3,399,260
Brazil	(1)	[2] 70,000	[2] 70,000	[2] 70,000	[2] 70,000
Canada	410,192	923,362	629,386	605,674	787,903
China	560,000	520,000	480,000	369,617	305,000
Chosen	83,221	99,933	99,795	101,933	(1)
Czechoslovakia	334,837	817,050	983,042	1,166,422	1,087,984
Finland	13,072	9,257	10,653	11,352	8,871
France	5,276,802	5,467,872	7,692,565	8,505,122	9,392,917
Germany (exclusive of the Saar)	9,194,517	4,940,505	7,832,554	10,088,751	9,643,519
Saar	1,156,000	1,021,000	1,389,117	1,453,056	1,638,051
Great Britain	4,980,982	7,559,920	7,436,368	6,362,200	2,480,700
Hungary	117,000	124,445	115,502	93,130	187,813
India, British	374,336	655,221	923,125	906,838	914,000
Italy	177,802	269,166	341,317	536,245	558,509
Japan	478,088	530,536	473,308	513,963	(1)
Luxemburg	1,679,318	1,406,666	2,157,170	2,363,253	2,559,151
Mexico	23,769	21,210	19,485	38,000	(1)
New Zealand	82	----------	640	1,310	4,061
Norway	3,759	26,395	64,955	87,931	(1)
Philippine Islands	156	269	273	398	(1)
Poland	273,516	547,288	335,850	314,564	327,500
Rumania	31,419	39,102	46,081	64,273	(1)
Russia [3]	166,828	383,803	664,648	1,303,611	2,193,494
Spain	210,099	408,659	510,279	530,029	488,696
Sweden	275,441	301,619	535,361	462,559	499,535
United States	27,656,783	41,008,942	31,909,853	37,289,610	40,004,661
Yugoslavia	15,348	26,361	15,019	3,494	18,768

[1] Data not available. [2] Official estimate of annual production. [3] Year ended Sept. 30.

FERRO-ALLOYS

PRODUCTION, SHIPMENTS, VALUE, AND PRICES

In these reports the statistics on the output of ferro-alloys in the United States are separated from those of pig iron in order that the values given may be more nearly accurate. Although the quantity of ferro-alloys is relatively small, the values per ton are so high that failure to separate the figures would unduly increase the apparent average value of the pig iron.

The shipments of ferro-alloys of all classes in 1926 increased 12 per cent in quantity and 16 per cent in total value as compared with 1925. The production of ferro-alloys in 1925 was 575,455 gross tons; in 1926 it was 674,389 tons, an increase of 17 per cent. Ferro-alloys were made in 1926 at 13 blast furnaces, 15 electric furnaces, and 2 alumino-thermic plants; in addition, 3 plants made ferrosilicon and 1 plant made ferrophosphorus as a by-product.

Ferro-alloys shipped from furnaces in the United States, 1925–26, by varieties

Variety of alloy	1925		1926	
	Gross tons	Value	Gross tons	Value
Ferromanganese	254,005	$26,006,439	330,070	$31,711,871
Silicomanganese and silicospiegeleisen			2,183	354,364
Spiegeleisen	95,890	2,407,226	82,982	2,016,088
Ferrosilicon (7 per cent or more silicon)	221,387	11,405,060	233,428	12,119,465
Ferromolybdenum and calcium-molybdenum compounds	210	236,957	1,096	1,051,881
Ferrotungsten	1,238	1,991,123	1,771	2,900,053
Ferrovanadium	1,841	4,843,635	1,777	4,721,903
Other varieties [1]	41,651	6,157,660	35,951	6,492,782
	616,222	53,048,100	689,258	61,368,407

[1] 1925: Ferrochromium, ferrophosphorus, ferrotitanium, ferrouranium, ferrozirconium, and zirconium-ferrosilicon; 1926: Ferrochromium, ferrophosphorus, ferrotitanium, ferrozirconium, and zirconium-ferrosilicon.

Ferro-alloys shipped from furnaces in the United States, 1917–1926, in gross tons [1]

Year	Ferro-manganese	Spiegel-eisen	Other varieties	Total	
				Quantity	Value
1917 [1]	260, 225	189, 241	184, 555	634, 021	$83, 731, 724
1918 [1]	306, 076	263, 861	180, 931	750, 868	115, 433, 943
1919	198, 255	90, 855	130, 528	419, 638	53, 730, 964
1920	276, 594	103, 672	232, 542	612, 808	77, 519, 367
1921	111, 374	69, 230	68, 023	248, 627	21, 697, 785
1922	161, 612	70, 253	191, 415	423, 280	28, 259, 004
1923	226, 365	134, 086	219, 366	579, 817	49, 877, 231
1924	232, 821	76, 179	188, 244	497, 244	43, 249, 948
1925	254, 005	95, 890	266, 327	616, 222	53, 048, 100
1926	330, 070	82, 982	276, 206	689, 258	61, 368, 407

[1] The figures for 1917 and 1918 fall short of the actual production of the United States, as the output of certain electrically produced ferro-alloys is not available for publication.

The following records of average contract prices of ferromanganese and of spiegeleisen, by months, for the last four years, show a wide range. The ferromanganese prices are quoted for material "delivered at Pittsburgh"; those of spiegeleisen are prices at producers' furnaces.

Quoted prices per ton of ferromanganese and spiegeleisen, 1923–1926 [1]

Month	Ferromanganese (delivered at Pittsburgh)				Spiegeleisen (at producers' furnaces)			
	1923	1924	1925	1926	1923	1924	1925	1926
January	$109. 79	$113. 79	$116. 79	$119. 79	$34. 90	$39. 00	$32. 00	$34. 00
February	112. 29	112. 29	119. 79	119. 79	35. 75	39. 00	33. 00	34. 00
March	120. 79	112. 29	119. 79	102. 29	37. 25	38. 00	33. 00	34. 00
April	124. 79	112. 29	119. 79	92. 79	39. 25	36. 00	33. 00	34. 00
May	129. 79	112. 29	119. 79	92. 79	43. 00	36. 75	33. 00	34. 00
June	129. 79	112. 29	119. 79	92. 79	46. 00	36. 00	32. 00	34. 00
July	122. 29	110. 79	119. 79	92. 79	45. 00	35. 00	31. 50	34. 00
August	122. 29	98. 79	119. 79	92. 79	45. 00	32. 50	32. 25	34. 00
September	114. 79	97. 79	119. 79	92. 79	43. 50	32. 00	33. 00	34. 00
October	112. 79	104. 79	119. 79	99. 79	40. 00	31. 00	33. 00	34. 00
November	113. 79	107. 29	119. 79	104. 79	39. 00	31. 75	34. 00	38. 75
December	113. 79	109. 79	119. 79	104. 79	38. 00	31. 00	34. 00	37. 00

[1] Iron Trade Review.

Ferromanganese.—The shipments of ferromanganese in 1926 amounted to 330,070 gross tons, an increase of 31 per cent over 1925. The average value per ton f. o. b. furnaces reported for ferromanganese was $96.08 in 1926, compared with $101.78 in 1925. Ferromanganese was made at 8 furnaces by 3 producers in both 1925 and 1926.

The production of ferromanganese in 1926 was 318,052 gross tons, containing 252,066 tons of manganese (metal), an average of 79.25 per cent of manganese. In the production of ferromanganese in 1926 there were used 619,898 gross tons of foreign manganese ore, 36,309 tons of domestic manganese ore, 488 tons of domestic manganiferous iron ore, 7,576 tons of iron ore, and 5,122 tons of cinder, scale, and scrap. The quantity of manganese ore used per ton of ferromanganese made in 1926 was 2.063 tons; in 1925 it was 2.133 tons; and in 1924 it was 2.186 tons. Of the foreign manganese ore used in 1926, Russia supplied 282,954 gross tons; Brazil, 237,358 tons; Africa, 42,692 tons; India, 31,667 tons; and the remainder was from Cuba, Chile, and Porto Rico. The quantity of domestic manganese ore used in the manufacture of ferromanganese in 1926 represented only 5.5 per cent of the total manganese ore used.

Manganese ore and other metallic materials consumed and ferromanganese produced in the United States, 1921–1926

Year	Materials consumed (gross tons)				Ferromanganese produced			Manganese ore used per ton of ferromanganese made (gross tons)
	Manganese ore		Iron and manganiferous iron ores	Cinder, scale, and scrap	Gross tons	Manganese contained		
	Foreign	Domestic				Per cent	Gross tons	
1921	208, 376	17, 839	143	2, 092	104, 129	76. 17	79, 319	2. 172
1922	335, 165	1, 804	----------	5, 252	150, 010	78. 55	117, 836	2. 246
1923	538, 280	26, 790	489	6, 945	251, 938	78. 13	196, 844	2. 243
1924	443, 260	20, 133	909	4, 434	211, 965	78. 21	165, 776	2. 186
1925	519, 139	34, 942	4, 949	11, 072	259, 780	78. 93	205, 046	2. 133
1926	619, 898	36, 309	8, 064	5, 122	318, 052	79. 25	252, 066	2. 063

Manganese ore used in the manufacture of ferromanganese in the United States, 1925–26, by sources of ore, in gross tons

Source of ore	1925	1926
Africa	33, 582	42, 692
Brazil	207, 238	237, 358
Chile	2, 062	5, 653
China	606	----------
Cuba	10, 543	18, 372
India	68, 326	31, 667
Porto Rico	2, 776	1, 202
Russia	194, 006	282, 954
	519, 139	619, 898
United States	34, 942	36, 309
	554, 081	656, 207

Spiegeleisen.—The shipments of spiegeleisen in 1926, amounting to 82,982 gross tons, were 13 per cent less than in 1925. The average value per ton at the furnaces in 1926 was $24.30; in 1925 it was $25.10. Spiegeleisen was made at two furnaces by two producers in both 1925 and 1926.

The production of spiegeleisen in 1926 was 74,581 gross tons, containing 14,717 tons of manganese (metal), an average of 19.73 per cent of manganese. In the production of spiegeleisen in 1926 there were used 149,374 tons of zinc residuum which contained about 12 per cent of manganese and 42 per cent of iron, 203 tons of manganese ore, 760 tons of iron ore, and 229 tons of scrap. The quantity of these materials used per ton of spiegeleisen made in 1926 was 2.019 tons; in 1925 it was 1.87 tons; and in 1924 it was 1.919 tons.

Ferrosilicon.—The ferrosilicon produced in 1926 amounted to 234,453 gross tons, compared with 207,818 tons in 1925, an increase of 13 per cent. Of the ferrosilicon produced in 1926 a little more than 42 per cent was made by the blast-furnace process, 57 per cent by the electric-furnace process, and a little as a by-product of electric furnaces in the manufacture of artificial abrasives. The shipments of ferrosilicon in 1926 amounted to 233,428 gross tons and were 5 per cent more than in 1925.

Ferromolybdenum and calcium-molybdenum compounds.—The production of ferromolybdenum and calcium-molybdenum compounds in 1926 was 1,248 gross tons, containing 1,010,849 pounds of molybdenum (metal). The ferromolybdenum averaged 58.43 per cent of molybdenum and the calcium-molybdenum compounds averaged 34.54 per cent. Ferromolybdenum was made at 2 furnaces by 2 producers and calcium-molybdenum compounds were made at 3 furnaces by 3 producers in 1926. The molybdenum ore used in making ferromolybdenum and calcium-molybdenum compounds was mined in Colorado and New Mexico.

The shipments of ferromolybdenum and calcium-molybdenum compounds in 1926, amounting to 1,096 gross tons, contained 871,676 pounds of molybdenum, and the average value per pound of the contained molybdenum (f. o. b. furnaces) was $1.21, compared with $1.27 in 1925.

Ferrotungsten.—The production of ferrotungsten in 1926 was 1,808 gross tons, containing 3,121,928 pounds of tungsten (metal), an average of 77.09 per cent of tungsten. Ferrotungsten was made at 5 furnaces—4 electric and 1 alumino-thermic—by 5 producers in both 1925 and 1926. The greater part of the ferrotungsten produced in 1926 was made from foreign ores, chiefly from China and Burma. The domestic ores used came mostly from California and Nevada, but a little ore from Arizona, Colorado, and South Dakota was also used.

The shipments of ferrotungsten in 1926, amounting to 1,771 gross tons, contained 3,063,004 pounds of tungsten, and the average value per pound of contained tungsten was 95 cents f. o. b. furnaces, compared with 93 cents in 1925.

Ferrovanadium.—The ferrovanadium produced in 1926 amounted to 1,962 gross tons, containing 1,588,591 pounds of vanadium (metal), an average of 36.15 per cent of vanadium. Ferrovanadium was made at 5 furnaces—3 electric and 2 alumino-thermic—by 5 producers in 1926. The ferrovanadium produced in 1926 was made chiefly from foreign ores—patronite and its oxidation products from Peru, and vanadinite and descloizite from Northern Rhodesia and British Southwest Africa. Some vanadium pentoxide made from carnotite and roscoelite mined in Arizona, Colorado, and Utah was also used.

The shipments of ferrovanadium in 1926 were 1,777 gross tons, which contained 1,439,504 pounds of vanadium and were valued at the furnaces at an average of $3.28 per pound of contained vanadium, as compared with $3.30 in 1925.

IMPORTS AND EXPORTS

The imports of the alloys of the rarer metals are not all reported separately, but are grouped as shown in the next table. Ferromanganese constituted the bulk of the imports; 85 per cent of it came from Canada and Norway in 1926. The United Kingdom contributed only 13 per cent of the total imports of ferromanganese in 1926, as compared with 67 per cent in 1925.

Prior to the tariff of September 22, 1922, the Bureau of Foreign and Domestic Commerce recorded only the gross weight of the ferro-alloy imported. Since that date the import statistics are not uniform, the gross weight of some ferro-alloys and the contained rarer metal of others being recorded. The reader should bear this change in mind when comparing the quantities in the two following tables with quantities published before the change in tariff. The values, however, are comparable.

The exports of ferro-alloys are relatively unimportant. Ferromanganese and spiegeleisen, the exports of which in 1926 were about one-eighth of those in 1925, constituted the greater part of the total exports in 1926.

Ferro-alloys and ferro-alloy metals imported for consumption in the United States, 1925–26, by varieties

Variety of alloy	1925		1926	
	Gross tons	Value	Gross tons	Value
Ferromanganese (manganese content)	62,970	$6,033,147	47,768	$4,410,142
Spiegeleisen	1,090	39,841	8,783	256,714
Ferrochrome and chromium:				
Ferrochrome—				
Containing 3 per cent or more carbon (chromium content)	69	11,405	15	2,569
Containing less than 3 per cent carbon	588	129,510	495	120,235
Chrome or chromium metal	3	4,769	1	765
Chromium vanadium	32	5,065	20	2,811
Ferrosilicon (silicon content)	4,556	585,193	13,038	1,375,227
Molybdenum and ferromolybdenum (molybdenum content)	(1)	1,184	(2)	987
Titanium and ferrotitanium	17	6,698	23	9,189
Tungsten and ferrotungsten (tungsten content)	375	316,806	156	125,118
	----------	7,133,618	----------	6,303,757

[1] 274 pounds.

[2] 604 pounds.

Ferromanganese and ferrosilicon imported into the United States, 1925–26, by countries

[General imports]

Country	Ferromanganese (manganese content)				Ferrosilicon (silicon content)			
	1925		1926		1925		1926	
	Gross tons	Value	Gross tons	Value	Gross tons	Value	Gross tons	Value
Belgium	--------	----------	--------	----------	49	$4,663	--------	----------
Canada	7,838	$1,092,943	18,792	$2,098,701	4,201	547,274	12,781	$1,354,014
Chile	117	17,813	--------	----------	--------	----------	--------	----------
France	201	40,907	226	50,705	--------	----------	--------	----------
Germany	2,194	210,404	243	30,176	--------	----------	(1)	13
India, British	94	6,701	157	11,806	--------	----------	--------	----------
Italy	19	2,872	29	3,382	--------	----------	--------	----------
Netherlands	199	19,108	--------	----------	--------	----------	--------	----------
Norway	8,478	733,717	18,596	1,353,960	197	21,745	342	31,855
Sweden	3,162	316,901	149	17,676	97	10,053	--------	----------
Turkey in Europe	484	47,093	--------	----------	--------	----------	--------	----------
United Kingdom	45,291	4,089,861	5,740	572,062	12	1,458	1	164
	68,077	6,578,320	43,932	4,138,468	4,556	585,193	13,124	1,386,046

Less than 1 ton.

Ferro-alloys and ferro-alloy metals exported from the United States, 1924–1926, by varieties

Variety of alloy	1924		1925		1926	
	Gross tons	Value	Gross tons	Value	Gross tons	Value
Ferromanganese [1] Spiegeleisen [1]	3,165	$92,421	5,496	$160,568	693	$44,111
Ferrosilicon	775	29,214	(1)	(1)	(1)	(1)
Tungsten and ferrotungsten (including tungsten wire)	2	114,775	6	143,987	13	155,653
Ferrovanadium	25	81,016	46	106,754	(1)	(1)

[1] Not separately classified.

STEEL

PRODUCTION

The following tables showing the production of steel were compiled by the American Iron and Steel Institute. No data whatever are available on the value of the output of crude steel at the mills, but the weekly issues and annual statistical reviews of the Iron Age give market quotations of prices of steel billets and some of the leading forms of finished steel. The price of Bessemer steel billets at Pittsburgh in 1926 was $35 a gross ton throughout the year; in 1925 it ranged from $34.25 to $37. Tank plates at Pittsburgh ranged from 1.8 to 1.9 cents a pound in 1926 and from 1.8 to 2 cents a pound in 1925. Structural shapes at Pittsburgh ranged from 1.9 to 2 cents a pound in 1926 and from 1.9 to 2.1 cents in 1925.

Bessemer steel ingots and castings manufactured in the United States, 1922–1926, by States, in gross tons

State	1922	1923	1924	1925	1926
Ohio	2,324,425	3,557,579	2,557,689	2,963,590	3,035,809
Pennsylvania	2,474,956	3,115,840	2,210,868	2,354,231	2,420,719
Illinois	707,067	1,057,576	598,442	740,212	874,047
Other States	412,850	753,093	532,591	665,929	603,993
	5,919,298	8,484,088	5,899,590	6,723,962	6,934,568

Open-hearth steel ingots and castings manufactured in the United States, 1922–1926, by States, in gross tons

State	1922	1923	1924	1925	1926
New England States	204,343	268,630	252,273	296,091	288,533
New York and New Jersey	1,597,881	1,951,278	1,424,677	1,724,720	2,086,525
Pennsylvania	11,583,812	14,428,187	12,243,713	14,021,750	15,622,857
Ohio	6,770,293	7,786,820	7,119,786	8,799,951	8,628,247
Indiana	3,571,397	4,326,724	3,990,165	4,978,558	5,278,230
Illinois	2,077,920	2,579,095	2,184,068	2,817,027	2,871,688
Other States	3,503,337	4,558,923	4,362,668	5,396,391	5,915,899
	29,308,983	35,899,657	31,577,350	38,034,488	40,691,979

According to these tables there was an increase of 3 per cent in the production of Bessemer steel and of 7 per cent in open-hearth steel in 1926, as compared with 1925. The total production of steel increased 6 per cent. Of the total output in 1926, 84.3 per cent was represented by open-hearth steel, 14.3 per cent by Bessemer steel, and 1.4 per cent by all other classes of steel.

Of the total output of open-hearth steel, 39,653,315 gross tons was made by the basic process and 1,038,664 tons by the acid process, compared with 37,087,342 tons of basic steel and 947,146 tons of acid steel in 1925.

The production of steel by the electric process in 1926 showed an increase of 6 per cent as compared with 1925.

Steel electrically manufactured in the United States, 1909–1926, in gross tons

Year	Ingots	Castings	Total	Year	Ingots	Castings	Total
1909	13,456	306	13,762	1918	403,068	108,296	511,364
1910	50,821	1,320	52,141	1919	272,942	111,510	384,452
1911	27,227	1,878	29,105	1920	346,956	155,196	502,152
1912	14,147	4,162	18,309	1921	84,404	85,095	169,499
1913	20,973	9,207	30,180	1922	191,057	154,982	346,039
1914	15,458	8,551	24,009	1923	279,914	235,958	515,872
1915	46,348	23,064	69,412	1924	225,977	206,549	432,526
1916	126,048	42,870	168,918	1925	335,978	279,534	615,512
1917	239,632	64,911	304,543	1926	325,278	326,445	651,723

Figures for the total production of electric steel in 1926 include 306,811 tons of alloy-steel ingots and castings that were alloyed with nickel, vanadium, tungsten, chromium, molybdenum, and other metals (242,808 tons of ingots and 64,003 tons of castings), compared with 293,780 tons (249,374 tons of ingots and 44,406 tons of castings) so alloyed in 1925.

On December 31, 1926, the number of completed plants equipped for the manufacture of steel by the electric process was 212, as compared with 213 plants at the end of 1925.

Steel produced in the United States, 1810–1926, in gross tons

Year	Bessemer	Open-hearth	Crucible	Other steel	Total
1810–1870	58,482	2,232	146,370		207,084
1871	40,179	1,785	31,250		73,214
1872–1880	4,293,896	245,035	349,730	76,009	4,964,670
1881–1890	21,596,699	2,387,925	703,489	37,044	24,725,157
1891–1900	49,387,341	15,392,764	762,446	35,820	65,578,371
1901–1910	94,048,698	92,418,814	1,051,379	154,683	187,673,574
1911–1915	42,329,520	98,833,090	544,047	185,692	141,892,349
1916	11,059,039	31,415,427	129,692	169,522	42,773,680
1917	10,479,960	34,148,893	126,716	305,038	45,060,607
1918	9,376,236	34,459,391	115,112	511,693	44,462,432
1919	7,271,562	26,948.694	63,572	387,404	34,671,232
1920	8,883,087	32,671,895	72,265	505,687	42,132,934
1921	4,015,938	15,589,802	7,613	170,444	19,783,797
1922	5,919,298	29,308,983	28,606	346,039	35,602,926
1923	8,484,088	35,899,657	44,079	515,872	44,943,696
1924	5,899,590	31,577,350	22,473	432.526	37,931,939
1925	6,723,962	38,034,488	19,562	615,512	45,393,524
1926	6,934,568	40,691.979	15,493	651,723	48,293,763

FOREIGN TRADE IN STEEL

The following tables show the imports and exports of certain iron and steel products:

Iron and steel imported into the United States, 1924–1926

Article	1924		1925		1926	
	Gross tons	Value	Gross tons	Value	Gross tons	Value
Bar iron	4, 325	$262, 164	11, 740	$538, 488	5, 624	$291, 239
Boiler and other plate of iron and steel	3, 276	125, 705	818	50, 014	4, 945	143, 567
Iron and steel scrap	66, 841	1, 026, 277	99, 815	1, 361, 342	86, 725	990, 565
Rails for railways	43, 358	1, 313, 041	36, 872	1, 050, 578	55, 212	1, 449, 178
Sheets of iron or steel, skelp, saw plates and steel, n. e. s	2, 789	200, 235	3, 662	292, 155	10, 671	563, 073
Steel ingots, bars, etc	39, 024	3, 074, 303	27, 081	1, 768, 784	30, 826	1, 323, 522
Tin and terne plates	1, 036	157, 659	381	107, 624	2, 160	297, 483
Wire and articles made from wire	--------	6, 130, 604	--------	4, 611, 333	--------	5, 059, 623
Wire rods	6, 851	460, 367	7, 988	539, 241	10, 074	691, 984
All other manufactures of iron and steel (not specially provided for)	--------	2, 264, 462	--------	2, 244, 852	--------	3, 321, 138

Iron and steel exported from the United States, 1924–1926

Article	1924		1925		1926	
	Gross tons	Value	Gross tons	Value	Gross tons	Value
Axes	--------	$1, 569, 024	--------	$1, 340, 631	--------	$1, 054, 626
Bars or rods (of steel):						
Wire	18, 762	1, 048, 174	21, 207	1, 081, 995	19, 646	1, 085, 946
All other	102, 276	7, 804, 417	115, 641	8, 308, 035	142, 716	9, 858, 464
Billets, ingots, blooms, sheet, bar, and skelp	96, 096	4, 656, 225	87, 479	3, 891, 586	100, 954	4, 554, 545
Bolts and nuts	17, 495	2, 930, 966	16, 962	2, 819, 041	13, 221	2, 408, 704
Hammers and hatchets	--------	348, 867	--------	418, 534	--------	363, 142
Hoops and bands	34, 141	2, 942, 593	28, 695	2, 079, 432	34, 104	2, 305, 090
Horseshoes	963	121, 528	709	115, 872	660	102, 342
Horseshoe nails	1, 025	275, 986	919	257, 035	1, 055	278, 823
Iron bars	5, 054	514, 311	4, 616	424, 539	5, 171	444, 975
Iron and steel scrap	97, 748	1, 531, 361	82, 573	1, 377, 033	104, 838	1, 794, 256
Nails:						
Cut nails	2, 122	195, 547	1, 616	148, 369	1, 070	101, 098
Wire nails	21, 665	1, 934, 081	9, 838	833, 732	11, 743	885, 372
All other, including tacks	4, 739	1, 133, 523	6, 699	1, 370, 949	5, 799	1, 255, 201
Radiators and cast-iron house-heating boilers	3, 875	782, 044	3, 567	716, 814	(1)	392, 278
Rails for railways, of steel	208, 496	7, 950, 627	151, 690	6, 155, 156	187, 557	7, 643, 232
Railroad spikes	7, 986	577, 976	7, 728	541, 731	5, 528	387, 268
Railroad-track material, switches, frogs, fishplates, splices, bars, etc	25, 885	2, 637, 730	25, 506	2, 425, 945	36, 242	2, 956, 471
Saws	1, 589	2, 497, 832	1, 690	2, 463, 304	(1)	1, 900, 049
Sheets and plates:						
Galvanized	108, 152	11, 940, 379	160, 269	16, 841, 928	178, 634	18, 392, 449
Iron	10, 955	583, 339	16, 341	925, 854	14, 758	788, 415
Shovels and spades	--------	506, 555	--------	487, 918	--------	431, 859
Steel:						
Plates, not fabricated	81, 686	5, 042, 169	100, 099	5, 980, 935	129, 225	7, 156, 622
Sheets, black	148, 742	13, 302, 370	95, 433	8, 210, 841	175, 740	14, 194, 687
Structural iron and steel	167, 910	13, 009, 647	169, 252	11, 137, 399	233, 060	11, 404, 199
Tin and terne plates	160, 997	19, 430, 327	161, 385	18, 586, 890	250, 781	28, 766, 352
Tubular products and fittings:						
Boiler tubes	12, 363	1, 732, 237	13, 859	1, 783, 751	18, 454	2, 203, 649
Casings and oil-line pipes	87, 383	8, 977, 576	107, 416	10, 105, 512	132, 407	12, 598, 867
Welded black pipes	64, 964	6, 411, 242	68, 886	6, 666, 565	84, 027	7, 704, 256
Welded galvanized pipes	36, 241	3, 847, 972	39, 630	4, 262, 255	40, 563	4, 014, 834
Malleable-iron screwed pipe fittings	11, 024	2, 855, 563	6, 728	1, 432, 721	12, 367	3, 433, 956
Cast-iron pressure-pipe fittings	13, 364	2, 527, 809	16, 483	1, 720, 213	13, 118	1, 312, 751
Cast-iron soil pipes and fittings	7, 432	597, 034	8, 994	747, 614	10, 726	801, 498
Cast-iron screwed pipe fittings	7, 975	1, 352, 592	9, 886	2, 824, 767	10, 268	1, 980. 142
Wire:						
Barbed	87, 033	6, 524, 302	67, 408	4, 730, 926	46, 565	3, 212, 353
All other	58, 479	8, 277, 471	54, 553	7, 954, 472	51, 957	7, 664, 484
All other tools	--------	10, 665, 572	--------	12, 591, 882	--------	13, 041, 882

[1] Weight not recorded.

MERCURY

By J. W. Furness[1]

STATISTICAL SUMMARY[2]

Summary of statistics for mercury in the United States, 1925–26

		1925	1926
Production	flasks	9,174	7,642
Number of producing mines		13	17
Average price per flask:			
San Francisco		$82.67	$91.60
New York		$83.13	$91.90
London		£13 17s. 1d.	£15 13s. 6d.
Imports for consumption	pounds	1,564,112	1,948,170
	equivalent in flasks	20,855	25,976
Exports	pounds	15,289	8,668
	equivalent in flasks	204	116
Stocks in warehouse at end of the year	flasks	1,181	2,277

INTRODUCTION

In 1874 the domestic production of mercury was 27,756 flasks; the average price for the year was $105.18 a flask at San Francisco. The peak of domestic production was reached in 1877, when the output was 79,395 flasks, and the average price for the year was $37.30 a flask. The large production in 1877 was no doubt due to high prices during 1874. The highest price for 1874 was $118.55 and the lowest was $91.80. In 1875 the price dropped to a low of $49.75, and thereafter until 1889 (when the average was $45) the average yearly price ranged from $28.23 to $44 a flask. During the seven-year period, 1874 to 1880, the output was greater than in any period of similar length, and the largest number of producing mines in any one of these seven years was 21. In 1916 there were 66 producing mines; the year's production was 29,932 flasks, and the average price for the year at San Francisco was $125.89. In 1925 and 1926, respectively, the production from domestic mines was 9,174 flasks and 7,642 flasks, the number of mines 13 and 17, and the average price (San Francisco) $82.67 and $91.60. Thus, in 1926, despite larger demand and higher price as compared with 1925, there was a material decline in production. The trends outlined tend to show the exhaustion of the domestic resources available at the price level prevailing in 1926.

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[1] Figures on domestic production compiled by H. M. Meyer and those on imports and exports, from records of the Bureau of Foreign and Domestic Commerce, by J. A. Dorsey, both of the Bureau of Mines.

[2] Preliminary estimates of the (essential) principal statistical items herein supplanted by final figures for 1926 were released by the Bureau of Mines Apr. 28, 1927.

The decrease in domestic production may be attributed in the main to the smaller output from California. In 1925 this State produced 7,614 flasks, or 83 per cent of the total domestic production, and in 1926, 5,726 flasks, or 75 per cent of the total domestic production. In 1925 the domestic operators recovered 397 flasks from old mine dumps; in 1926 they produced 193 flasks from that source.

The United States Tariff Commission (Information Series No. 21, 1920, p. 250) has refuted the statement " the United States can furnish an adequate supply of quicksilver for years to come, provided prices are maintained " by the counterstatement " the rich ores, however, are practically exhausted, and few mines have large reserves even of low-grade ore."

During the last few years the demand for mercury in the United States has been greatly augmented by the requirements of the radio industry and for electrical equipment, and by the utilization of the metal for maintaining uniform temperature in the distillation of oil. The amount of mercury used by the industries manufacturing felt hats, fulminates, and pigments (vermilion and antifouling paint) has remained relatively constant. In the past, with the exception of minor uses, the service rendered by mercury was comparatively short and little mercury was reclaimed. Where mercury is used as a vapor for power generation and heat transfer, little metal is lost and the time of service greatly increased. In satisfying requirements of this kind a peak demand is soon reached, and relatively little virgin metal is required thereafter. This statement may be clarified by calling attention to the falling off in demand for new lead, possibly because of the recovery of upwards of 90 per cent of the lead utilized in the manufacture of storage batteries for automobiles and radio apparatus.

DOMESTIC PRODUCTION

The production of mercury in the United States in 1926 amounted to 7,642 flasks, valued at $702,323; in 1925 it was 9,174 flasks, valued at $762,616. Thus, there was a decrease of 17 per cent in quantity and 8 per cent in value in 1926. The production of 1926 came from 7 mines in California, 9 mines in Arizona, Idaho, Nevada, Texas, and Washington, and 1 mine in Alaska, a total of 17 producing mines. The average tenor of the ore treated in 1926 was 0.54 per cent.

Mercury produced in the United States, 1917–1926

	Producing mines	Ore treated (short tons)	Mercury obtained		
			Weighted mean percentage tenor	Flasks of 75 pounds	Value
1917	51	280,484	0.48	36,159	$3,808,266
1918	47	415,654	.30	32,883	3,863,752
1919	34	188,673	.42	21,415	1,933,560
1920	17	109,230	.46	13,392	1,066,807
1921	11	34,850	.63	6,339	300,595
1922	10	43,084	.51	6,375	368,348
1923	14	50,796	.59	7,937	521,302
1924:					
California	6	59,402	.48	[1] 7,966	547,185
Texas, Nevada, Arizona, Oregon, and Idaho	7	10,789	[2].59	[3] 2,119	145,554
	13	70,191	.50	10,085	692,739
1925:					
California	7	58,723	.49	[4] 7,614	632,936
Texas, Nevada, Arizona, and Idaho	6	6,655	.66	[5] 1,560	129,680
	13	65,378	.50	9,174	762,616
1926:					
California	7	40,825	.51	[6] 5,726	526,237
Idaho	1	9	2.50	6	551
Nevada	4	19	3.00	[7] 197	18,105
Washington	1	900	2.04	489	44,941
Texas, Alaska, and Arizona	4	8,929	.51	1,224	112,489
	17	50,682	.54	7,642	702,323

[1] Includes 214 flasks obtained from clean-ups, etc., not considered in calculating percentage tenor.
[2] Takes into account a small amount left in condensers at one mine, not included in production.
[3] Includes 471 flasks obtained from an unknown quantity of ore, not considered in calculating percentage tenor.
[4] Includes 2 flasks obtained from clean-ups, etc., which does not affect the percentage tenor.
[5] Includes 395 flasks obtained from clean-ups, etc., not considered in calculating percentage tenor.
[6] Includes 164 flasks from an unknown quantity of ore and 11 flasks from clean-ups, etc., not included in calculating percentage tenor.
[7] Includes 182 flasks from clean-ups, etc., not included in calculating percentage tenor.

PRICES

Average yearly prices of mercury in the United States and the United Kingdom, 1913–1926

[Per flask of 75 pounds]

Year	San Francisco (domestic)[1]	New York [2]	London [3]			Year	San Francisco (domestic)[1]	New York [2]	London [3]		
			£	*s.*	*d.*				£	*s.*	*d*
1913	$40.23	$39.54	7	9	2	1920	$79.66	$81.12	20	14	9
1914	49.05	48.31	[4] 7	15	0	1921	47.42	45.46	11	3	5
1915	85.80	87.01	14	10	8	1922	57.78	58.95	11	11	6
1916	125.89	125.49	17	2	10	1923	65.68	66.50	10	4	9
1917	105.32	106.30	22	4	3	1924	68.69	69.76	11	19	8
1918	117.50	123.47		(5)		1925	82.67	83.13	13	17	1
1919	90.29	92.15	20	9	5½	1926	91.60	91.90	15	13	6

[1] Mining and Scientific Press, San Francisco.
[2] Engineering and Mining Journal, New York. } Eng. and Min. Jour.-Press, 1922–1925; Eng. and Min. Jour., 1926.
[3] Mining Journal (London).
[4] Metal exchange closed about three months after outbreak of war. Average based on 37 weeks only.
[5] Quoted as "nominal" only.

Prices of domestic mercury at San Francisco, 1922–1926, by months[1]

[Per flask of 75 pounds]

Month	1922	1923	1924	1925	1926	Month	1922	1923	1924	1925	1926
January	$48.50	$71.05	$59.56	$81.16	$90.13	July	$54.55	$66.25	$71.70	$82.71	$90.10
February	47.65	69.20	59.53	80.90	89.00	August	56.15	65.01	71.47	82.50	89.42
March	48.65	69.53	61.27	80.85	89.01	September	63.95	61.87	71.54	81.28	89.83
April	50.85	70.26	71.33	81.34	89.25	October	70.45	61.00	71.64	81.10	94.27
May	54.40	67.16	72.65	81.60	90.60	November	70.45	61.34	72.43	88.04	98.33
June	54.75	66.80	71.91	82.21	90.71	December	70.75	59.95	70.84	90.39	98.84

[1] Engineering and Mining Journal.

In January, 1926, the average New York price of mercury was $87.96 a flask. At that time there seemed to be nothing in the situation that would indicate an abnormal consumption. At the close of the month stocks on hand were relatively low. Until October 1 the price fluctuated between small limits, the monthly average price ranging from a low of $87.58 to a high of $91.425. During October, November, and December the price advanced to $99.51 a flask, which was the average price during December.[3] The May, 1926, American Metal Market, Monthly Review Section, page 18, states that "practically no Spanish metal is now available from the mines, and there will not be any for shipment before October, while the Italian mines are reported sold up to July." In October Spanish mercury was again on the market.

The rise in price in the last quarter of 1926 was due to the increased demand in the United States, as shown by increased imports, and the continued demand of continental Europe.

If the world's production of 1926 be taken as a measure of consumption in conjunction with the absorption of accumulated stocks held by producers, the world's consumption of mercury in 1926 was greater than in any year since 1896, with the possible exception of the war year, 1917.

IMPORTS AND EXPORTS

In 1926 the general imports of mercury were 28,614 flasks, as compared with 22,781 flasks in 1925. The 1926 imports were higher than those of any previous year; they included 14,117 flasks from Spain, 11,768 flasks from Italy, and 2,729 flasks from the rest of the world. The exports for 1926 were 116 flasks. On December 31, 1926, there were 2,277 flasks in bonded warehouses as compared with 1,181 flasks on December 31, 1925.

Mercury imported for consumption in the United States, 1919–1926

Year	Pounds	Metric tons	Flasks	Value
1919	797,613	361.79	10,635	$791,226
1920	1,062,647	482.01	14,169	971,510
1921	795,078	360.64	10,601	457,993
1922	1,269,004	575.61	16,920	757,842
1923	1,355,499	614.84	18,073	816,043
1924	987,719	448.02	13,170	566,820
1925	1,564,112	709.47	20,855	1,200,878
1926	1,948,170	883.68	25,976	1,784,250

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[3] Engineering and Mining Journal.

Mercury imported into the United States, 1923–1926, by countries

[General imports]

Country	1923		1924		1925		1926	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Argentina	2,700	$1,301						
Belgium			3,000	$1,937	11,250	$9,700		
Canada					22,500	18,828	13,310	$11,678
Chile	805	650						
Cuba			2,475	1,090				
Germany	6,273	4,525	10,605	5,852	6	7	1,670	1,501
Honduras	175	88						
Hong Kong			5	4				
Italy	472,421	273,401	583,380	336,025	843,358	640,150	882,589	830,781
Mexico	85,868	46,749	87,096	43,465	74,377	50,607	80,412	67,609
Portugal							59,220	47,466
Spain	800,529	448,963	80,717	45,294	731,569	579,344	1,058,775	966,368
Turkey in Europe							12,600	11,178
United Kingdom	199,780	125,354	138,400	87,203	25,500	22,950	37,500	34,877
	1,568,551	901,031	905,678	520,870	1,708,560	1,321,586	2,146,076	1,971,458

Mercury exported from the United States, 1919–1926

Year	Pounds	Metric tons	Flasks	Value
1919	683,004	309.80	9,107	$817,328
1920	116,493	52.84	1,553	129,993
1921	29,501	13.38	393	18,869
1922	21,834	9.90	291	15,910
1923	23,827	10.81	318	25,195
1924	15,581	7.07	208	14,333
1925	15,289	6.93	204	15,930
1926	8,668	3.93	116	10,319

Mercury exported from the United States, 1924–1926, by countries

Country	1924		1925		1926	
	Pounds	Value	Poun	Value	Pounds	Value
North America:						
British Honduras	50	$50				
Canada	2,421	2,000	4,388	$4,155	1,644	$1,595
Costa Rica	570	531	512	591		
Guatemala	450	360	107	108		
Honduras	87	96	228	305	20	34
Mexico	1,431	1,788	677	704	723	848
Nicaragua	675	660	965	1,119	75	105
Panama	2	2	249	216		
Salvador	600	622	170	208	225	240
West Indies—						
Cuba	630	717	828	1,088	440	596
Dominican Republic	1,126	787			97	114
Dutch	25	29				
Haiti	155	159			81	106
Jamaica					10	14
Virgin Islands of the United States	30	13				
South America:						
Brazil	97	104	100	165	823	852
Chile			341	492	252	344
Colombia	3,449	2,965	2,951	3,147	814	1,085
Ecuador	60	70	532	537		
Peru	690	799	869	1,050	421	607
Venezuela	397	374	550	449	257	317
Europe:						
Norway					40	62
Sweden			99	70		
United Kingdom	50	44	48	96		
Asia:						
China	30	28			411	493
India (British)			60	76		
Japan			80	143		
Philippine Islands	1,676	1,625	435	518	2,335	2,907
Oceania:						
Australia			1,100	693		
New Zealand	880	510				
	15,581	14,333	15,289	15,930	8,668	10,319

CONSUMPTION AND SUPPLY

In 1896 the world's production of mercury was approximately 126,000 flasks. Since then, even during the war period, 1914 to 1918, this production has not been exceeded, thus indicating a gradual decrease in the world's consumption of mercury.

In 1912 the world's production was slightly in excess of 122,000 flasks. From this peak there was virtually a steady decline until 1921, when the production reached the lowest point attained during the last 47 years; namely, 63,000 flasks. It seems probable that had there been any accumulated stocks they would have been absorbed during the years 1912 to 1921. Since 1921 the world's price has been rising, and the world's production indicates a decided increase in consumption during this period. From 1868 to 1890 the largest uses of mercury were in placer mining and the panamalgamation of gold and silver. With the advent in 1900 of the cyanide process for the treatment of gold and silver ores the world's consumption of mercury was curtailed. The growth of consumption since 1921 is probably due largely to the use of mercury in radio apparatus and in part to the substitution of mercury pigment for the lead and antimony compounds used in coloring rubber. The uncertainty in regard to the continued use of mercury in radio apparatus will, no doubt, react upon the world's consumption of the metal.

At present the consumers of mercury depend in the main upon 6 mines—4 in Italy, 1 in Spain, and 1 in the United States. The mine in the United States has a known reserve, and its output is the smallest of the six.

Supply of mercury in the United States, 1907–1926

Year	Production		Imports for consumption		Exports		Apparent supply	
	Flasks	Value	Flasks	Value	Flasks	Value	Flasks	Value
1907	21, 554	$853, 538	221	$6, 719	5, 132	$192, 094	16, 643	$668, 163
1908	19, 752	872, 446	202	8, 216	2, 996	124, 960	16, 958	755, 702
1909	21, 075	957, 859	213	8, 203	6, 802	266, 243	14, 486	699, 819
1910	20, 601	958, 153	9	381	1, 923	91, 077	18, 687	867, 457
1911	21, 256	977, 989	6, 292	251, 386	291	13, 995	27, 257	1, 215, 380
1912	25, 064	1, 053, 941	1, 103	39, 920	310	13, 360	25, 857	1, 080, 501
1913	20, 213	813, 171	2, 289	75, 361	1, 140	43, 574	21, 362	844, 958
1914	16, 548	811, 680	8, 198	271, 984	1, 446	70, 753	23, 300	1, 012, 911
1915	21, 033	1, 804, 631	5, 625	282, 752	3, 372	225, 509	23, 286	1, 861, 874
1916	29, 932	3, 768, 139	5, 659	515, 919	8, 880	670, 475	26, 711	3, 613, 583
1917	36, 159	3, 808, 266	5, 207	448, 032	10, 778	998, 470	30, 588	3, 257, 828
1918	32, 883	3, 863, 752	6, 719	533, 622	3, 098	338, 620	36, 504	4, 058, 754
1919	21, 415	1, 933. 560	10, 635	791, 226	9, 107	817, 328	22, 943	1, 907, 458
1920	13, 392	1, 066, 807	14, 169	971, 510	1, 553	129, 993	26, 008	1, 908, 324
1921	6, 339	300, 595	10, 601	457, 993	393	18, 869	16, 547	739, 719
1922	6, 375	368, 348	16, 920	757, 842	291	15, 910	23, 004	1, 110, 280
1923	7, 937	521, 302	18, 073	816, 043	318	25, 195	25, 692	1, 312, 150
1924	10, 085	692, 739	13, 170	566, 820	208	14, 333	23, 047	1, 245, 226
1925	9, 174	762, 616	20, 855	1, 200, 878	204	15, 930	29, 825	1, 947, 564
1926	7, 642	702, 323	25, 976	1, 784, 250	116	10, 319	33, 502	2, 476, 254

USES

The major part of the mercury consumed in this country finds its way into trade in the form of various mercurial salts. Only a minor part of the consumption is required for use in scientific instruments, electrical equipment, and power generation. Formerly metallic mercury was largely used in the recovery of gold and silver from their ores. This demand has been greatly curtailed through the exhaustion of alluvial deposits of gold, the substitution of the cyanide and flotation processes for the recovery of gold from its ores, and the practical elimination of the panamalgamation process for the recovery of silver. A minor use was the backing of glass with mercury in the manufacture of mirrors. Tin has largely supplanted mercury for this purpose.

Of late years the radio industry has utilized a considerable amount of metallic mercury in the manufacture of radio tubes.

Mercury in the form of artificial cinnabar, known as vermilion red, is manufactured in this country from metallic mercury and sulphur; it contains, as a dry powder, 86.2 per cent mercury and 13.8 per cent sulphur. Because of the relatively high price of mercury in comparison with the metals which are a substitute for it, many compounds on the market are sold as substitutes for true vermilion. Among these is the so-called "American vermilion," sometimes known as chrome red, which is basically lead chromate. Another substitute, derived from coal tar and known as vermilionette, is made by precipitating eosine, a coal-tar dye, on such bases as barium sulphate, lead sulphate, or white lead. The production of vermilion red is a minor branch of the paint industry. In the past, the United States was a large importer of this pigment from China.[4]

According to the Dictionary of Tariff Information, 1924, page 606, one of the largest uses of mercury is in the manufacture of fulminates. In 1917 one-half of the domestic production of mercury was used in making blasting caps for high explosives and in drugs and chemicals. As this consumption was in war time, it can not be taken to represent consumption under the conditions of peace. It is estimated that upward of 4,000 flasks were utilized in the manufacture of fulminates in 1926. The mercury fulminate of commerce, a gray or brown sandlike powder, is manufactured from purified metallic mercury, nitric acid, and alcohol. The product is further refined by washing with water. For use in detonators there are substitutes such as the fulminate of soda and lead azide. Data as to the actual amount of domestic manufacture are not available.

Calomel and corrosive sublimate find their chief use as medicine and antiseptic, respectively. Corrosive sublimate, however, is also used in calico printing, preservation of wood, embalming, and as a fixing agent in photography. Corrosive sublimate—mercury bichloride—contains approximately 74 per cent mercury and 26 per cent chlorine; calomel—mercury monochloride—contains 85 per cent mercury and 15 per cent chlorine. The uses of calomel other than in medicine are negligible. Calomel and corrosive sublimate are manufactured from purified metallic mercury.

Other mercurial preparations, with the exception of red precipitate or mercuric oxide, require only a small amount of the mercury used by commerce. Mercuric oxide, which is prepared by heating mercuric nitrate, is used largely for the manufacture of antifouling paint for ship bottoms and for diluting pigments used in porcelain.

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[4] Vermilion red containing mercury is dutiable under the 1922 tariff act, par. 78, which states "Vermilion reds containing quicksilver, dry or ground in or mixed with oil or water, 28 cents per pound."

A seemingly growing consumption is that of what is known as white precipitate, or ammoniated mercury chloride, a compound obtained by treating a solution of corrosive sublimate (mercuric chloride) with an excess of ammonia. The white precipitate formed is marketed as powder and is used largely in the preparation of ointments.

The Bureau of the Census gives a list of the mercurial salts manufactured in 1925, as follows:

Mercurial salts manufactured in the United States in 1925

	Pounds	Value
Corrosive sublimate:		
Sold	341,834	$369,341
Made and consumed	18,646	(1)
	360,480	(1)
Calomel	102,341	136,003
Oxide:		
Sold	108,297	150,249
Made and consumed	13,924	(1)
	122,221	(1)
Ammoniated	50,467	80,750
Iodide	4,625	17,137
Other salts		239,291
Vermilion	344,374	345,293

[1] Value not given.

Vermilion reds (containing quicksilver), dry or ground in oil or water, imported for consumption in the United States, 1921–1926

Year	Pounds	Value	Duty
1921	4,756	$4,138	$620.70
1922:			
Jan.–Sept. 21	377	276	41.40
Sept. 22–Dec. 31	12,991	9,757	3,637.48
1923	78,449	61,104	21,965.72
1924	96,410	74,693	26,994.80
1925	173,334	154,479	48,533.52
1926	176,020	169,266	49,285.60

As compared with the uses enumerated, the consumption of mercury in the felt industry is small. The mercury is used in the form of a nitrate. About 0.37 of a flask makes one carboy, about 150 pounds, of nitrate of mercury. Data as to the annual consumption are not available.

Mercury is used as coloring matter in the manufacture of hard rubbers. The high price of mercury has resulted in a trend toward substitution of antimony sulphuret, but as yet there is little evidence of decreased consumption of mercury. The rather sudden growth of demand for other uses has caused the price to rise to a point where increased substitution is inevitable.

In the American Metal Market, June 25, 1927, page 3, in an article entitled "Increase in Spanish quicksilver production," the following appears:

> "Die Metallborse" takes the standpoint that the present profit, whether by merchants or speculators, is not justified, and also not without danger to the future of the industry. For certain purposes, such as for physical instruments and for certain pharmaceutical preparations, quicksilver can not be replaced, but for some purposes the former use of the metal may be discontinued on account of its price increasing too much the price of the end products. The dye industry is a case in point, where the high price of quicksilver threatens to suppress the manufacture of certain colors which depend on quicksilver or salts of the same for their production.

PRODUCTION PER MAN EMPLOYED IN MERCURY MINING

Data collected and compiled by the accidents statistics section of the division of mineral statistics, Bureau of Mines, indicate that of the total domestic production of 7,642 flasks of mercury in 1926, 6,578 flasks were produced by 254 men in 87,100 shifts. Thus, the production per man day was 0.0755 flask.

MINING INDUSTRY BY STATES

ALASKA

In 1926 the production of Alaska came from the Kuskokwim district. This is the first production of record for many years. The first authentic mention of the occurrence of mercury in Alaska was by Ivan Petrof[5] in 1884; he stated that in the Kuskokwim region well-defined veins of cinnabar, antimony, and silver-bearing salts are found. The Kuskokwim region has been described by P. S. Smith and A. G. Maddren. In discussing the possibly productive areas, the authors say:[6]

> Although the search for quicksilver deposits might disclose other than those now known, the character and occurrence of those that have been found and the difficulties of reduction and marketing seem to indicate that not many productive deposits will be opened in the region.

ARIZONA

In 1926 there was a small production of mercury in Arizona. During the year considerable activity prevailed in the Tonto Basin district, northeast of Phoenix.

CALIFORNIA

In 1926 the production of mercury in California was 5,726 flasks as compared with 7,614 flasks in 1925. The 1926 production was 75 per cent of the total output of the United States. In both 1925 and 1926 the number of producing properties was 7; one producer in 1925 and two in 1926 recovered mercury from old surface ores and dumps. Recently several old properties have changed hands and at present are being reequipped. Among them is the Sulphur Bank property, in Lake County, which has been taken over by F. W. Bradley and associates, who are installing a 100-ton rotary furnace and other equipment. This property was mined for sulphur in 1865. In Mineral Resources, 1918, part 1, the character of the deposit is described on page 169 as "Cinnabar and sulphur disseminated and in stringers in solfatarically altered basalt and in underlying Quaternary lake beds and in sandstone of the Franciscan group." The total production from this property has been about 95,000 flasks. Many authors have mentioned the Sulphur Bank property as illustrative of the deposition of cinnabar by hot mineral waters.[7] In 1918 the property was shut down and dismantled, and the underground workings were full of water.

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[5] Petrof, Ivan, "Report on population, industry, and resources of Alaska, 1884," pp. 13, 77, 90.

[6] Smith, P. S., and Maddren, A. G., Quicksilver Deposits of the Kuskokwim region, Alaska: U. S. Geol. Survey Bull. 622, 1915, pp. 272–291.

Another old property is the Aetna mine, situated in Napa County, 9 miles northeast of Calistoga and 17 miles from St. Helena. Ore was found on this property in 1854, and its estimated production has been 55,661 flasks. After being idle for six years operations were resumed on the property in the summer of 1925. In 1926 the property was operated by the Napa Properties, Consolidated, and has been reequipped.

The New Almaden mine in Santa Clara County is estimated to have produced 1,058,635 flasks to the end of 1926. During the entire period that this mine was worked its production was surpassed by only one mine in the world, the Almaden mine of Spain. In 1926 the property was closed down.[8]

One of the large producers of California has been the New Idria mine, in San Benito County, 40 miles southwest of Mendota and 58 miles southeast of Tres Pinos. The mine was discovered and located in 1853, and its total yield has been exceeded by that of only one other mine in North America—the New Almaden. It has produced approximately 98 per cent of the recorded output of mercury from San Benito County. In November, 1920, the property was closed down. The operating company, the New Idria Quicksilver Mining Co., liquidated its affairs and was succeeded by the New Idria Quicksilver Mines (Inc.), organized December 23, 1922, which adopted a new method of mining, and began work to remove all overburden, amounting to 1,500,000 to 2,000,000 tons, from the main ore body. This work will make available for mining all the old workings from the 300-foot level to the surface.[9]

IDAHO

The producing properties of Idaho are in the Yellow Pine district of Valley County. The mineralized area lies about 50 miles northeast of Cascade in what was known as the Thunder Mountain district. The cinnabar prospects are found in the upper part of the drainage basin of Meadow Creek,[10] northeast of Cascade, and are reached by a wagon road some 70 miles long. Inaccessibility has retarded development. In 1926 the production was 6 flasks from the United Mercury Mines Co. property.

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[7] Le Conte, J., and Rising, W. B., "The phenomena of metalliferous vein formation now in progress at Sulphur Bank, Calif.": Am. Jour. Sci., 3d ser., vol. 24, 1882, pp. 23–33.

[8] Engineering and Mining Journal: Vol. 122, July 3, 1926, p. 27.

[9] California State Mining Bureau, Mining in California, April, 1926.

[10] Larsen, E. S., and Livingston, D. C., Geology of the Yellow Pine Cinnabar-Mining District, Idaho: U. S. Geol. Survey Bull. 715, 1921, pp. 73–83.

NEVADA

In 1926 Nevada produced 197 flasks from four properties. Several properties changed hands during the year and there was considerable activity in prospecting for and in developing mercury properties. This activity unquestionably was due to the high price of mercury throughout the year.

OREGON

During the year the Mercury Mines Co., controlled by F. W. Bradley and associates, developed and equipped a deposit lying close to the Nevada-Oregon line in Malheur County, Oreg., and 100 miles north of Winnemucca, Nev., the shipping point. The ore is claimed to contain an average of 12 pounds of mercury to the ton. Mineralization is confined to a lens, lying virtually horizontal, which has been developed by tunneling. The property is equipped with a 100-ton reverberatory furnace, electric power plant, air compressor, etc. According to C. G. Dennis, general manager, the ore body proved by shafts, etc., averages 30 feet in thickness and is estimated to contain 150,000 tons of ore. He stated "there is now a strong possibility that a considerably greater tonnage will be developed by extending the tunnel into a known mineralized area that has not been developed." [11]

TEXAS

In Texas the only productive area now is the Terlingua district of Brewster County. The most productive mine is the Chisos, operated by the Chisos Mining Co. The ore body is said to be far from being exhausted. The property contains more than 30 miles of underground workings.[12] During 1926 the property known as the Waldron Quicksilver Mine began production; it was equipped with a 12-ton furnace, and about 3,000 feet of development work was done during the year. The mineralized area in the Terlingua district is relatively large. Development has been retarded by climatic conditions and transportation difficulties. Cinnabar is also found in Presidio County, Tex., and in the past some mercury has been produced.

WASHINGTON

In 1926 the output of mercury in Washington was 489 flasks, produced by Barnum & McDonell Mercury Co., Morton, Lewis County, from 900 tons of ore treated in a Johnson McKay 12-tube retort. The mine has been developed by some 1,600 feet of drifting and 480 feet of raises and winzes. All ore so far produced has come from development work.[13]

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[11] Mining Truth, Jan. 3, 1927, p. 24.
[12] Mineral Industry, 1923, p. 589.
[13] Engineering and Mining Journal: Vol. 123, Mar. 5, 1927, p. 416.

The Fisher Mercury Mining Co. has been developing a property adjoining the holdings of Barnum & McDonell Mercury Co.

There was considerable activity on Nigger Creek in Clallam County.

WORLD'S PRODUCTION

World's production of mercury, 1922–1926, by countries

[Compiled by L. M. Jones, of the Bureau of Mines]

[1 metric ton=29.395 flasks]

Country [1]	1922		1923		1924		1925		1926	
	Flasks	Metric tons	Flasks	Metric tons	Flasks	Metric tons	Flasks	Metric tons	Flasks	Metric tons
Algeria	--------	--------	--------	--------	79	2.7	58	2.0	76	2.6
Austria	--------	--------	--------	--------	132	4.5	179	6.1	(2)	(2)
China [3]	503	17.1	47	1.6	85	2.9	97	3.3	(2)	(2)
Czechoslovakia	185	6.3	1,514	51.5	2,287	77.8	(2)	(2)	(2)	(2)
Italy	45,298	1,541.0	48,666	1,655.6	48,237	1,641.0	53,898	1,833.6	54,998	1,871.0
Japan	35	1.2	(4)	(4)	--------	--------	--------	--------	(2)	(2)
Mexico	1,231	41.9	1,316	44.8	1,078	36.7	1,138	38.7	1,335	45.4
New Zealand	21	.7	--------	--------	--------	--------	--------	--------	(2)	(2)
Rumania	--------	--------	(5)	(5)	8	.3	97	3.3	(2)	(2)
Russia	647	22.0	1,499	51.0	[6] 1,945	[6] 66.2	[6] 291	[6] 9.9	(2)	(2)
Spain	38,748	1,318.2	33,646	1,144.6	26,417	898.7	37,546	1,277.3	46,861	1,594.2
United States	6,375	216.9	7,937	270.0	10,085	343.1	9,174	312.1	7,642	260.0
	93,043	3,165.3	94,625	3,219.1	90,353	3,073.9	[7] 104,000	[7] 3,500	(2)	(2)

[1] In addition to the countries shown in the table Turkey is a producer of mercury. Information furnished on May 21, 1923, by the United States High Commissioner of Turkey places this country's average annual production at approximately 67 tons (1,969 flasks). These figures are not included in the above totals.

[2] Data not available.

[3] Exports. Statistics of production are not available; official estimates of the output in 1925 range from 128 to 470 metric tons.

[4] 4 kilograms reported.

[5] Production of 200 tons of ore reported; metallic content not stated.

[6] Figures represent output for year ended Sept. 30.

[7] Estimate.

FOREIGN SOURCES

SPAIN

During the fiscal year 1924–25 the Government-owned Almaden mine in central Spain produced 19,491 metric tons of ore, which yielded 35,530 flasks, an increase of 10,479 metric tons of ore over the previous year and 6,506 flasks over the yearly average production of the period 1919–1924.

Since the expiration in 1921 of the contract for handling the output, which the Rothschilds, an English company, held for many years, the mercury has been sold directly through the Consejo de las Minas de Almaden Arrayanes. As a considerable stock had accumulated, in the fiscal year 1924–25 the company offered a 2½ per cent commission on minimum orders of 5,000 flasks, and sold 15,000 flasks under this arrangement. In addition, the company sold 20,951 flasks, making the total sales for the year 40,974 flasks, of which 40,150 flasks were exported.[14]

Late in 1925 an exclusive agency was given to The Sociedad General Mercurio de Almaden, of Caballero de Garcia, Madrid, for the years 1926 and 1927 with the option of an additional year.

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[14] Ferrin, A. W., Spanish Production of Mercury: Cons. Rept. 214959, Madrid, Spain, June 15, 1926.

The American Metal Market, June 25, 1927, page 3, under the heading "Increase in Spanish Quicksilver Production" quotes the following from "Die Metallborse":

> The agreement existing between the Spanish and Italian industries will probably mean that the respective productions will be maintained at existing proportions so that the production will rise or fall simultaneously in both cases.
>
> The postwar marketing methods are different from those which prevailed before the war. In place of the State sale of the Austrian production, sales are now effected privately in Italy and through the Rothschild house in Spain. Although the mines administrations of the two countries have come to an understanding, apparently this is not the reason of the high price of quicksilver in recent months.

Since 1918 the property has been more or less modernized, and Diesel-type motors generating upward of 600 horsepower have been installed. An up-to-date pumping plant has been installed, thus obviating the danger of the lower levels of the mine being flooded, as they were in 1918. Working conditions at the mine have been improved. For many years the mines were considered to be most unhealthful because of mercurial poisoning. This reputation probably comes from the fact that in ancient times the mines were worked by convicts and at times by forced levies. At present labor has imposed many regulations. The legal workday underground is six hours, and as the time necessary for the men to reach their working places is deducted, the actual length of shift in practice is four to four and one-half hours. The men work three shifts a week.

In 1923 a new scale of wages was granted, as shown by the following table:

Average daily wages paid at Almaden

Classes of workers	1918	1923
	Pesetas	*Pesetas*
Masons	3. 68	7. 06
Day laborers	2. 93	5. 73
Drillers	3. 37	6. 80
Mine cleaners	3. 15	6. 80
Smelter boys	2. 25	4. 25
Refiners, 1	4. 75	7. 20
Refiners, 2	4. 50	6. 86
Shorers, 1	5. 50	8. 33
Shorers, 2	4. 50	6. 86

Mercury produced in Spain, 1924–25

Province	Number of mines	Workmen		Ore mined		Metal produced		
		At mines	At plants	Metric tons	Tenor (per cent)	Flasks	Value [1]	Flasks per man
1924								
Ciudad Real	1	1, 023	395	14, 522	7. 00	26, 270	$1, 126, 408	18. 53
Granada	3	21	9	670	. 70	147	6, 669	4. 90
	4	1, 044	404	15, 192		26, 417	1, 133, 077	18. 24
1925								
Ciudad Real	1	1, 080	440	21, 519	7. 66	37, 346	2, 059, 714	24. 57
Granada	3	30	15	1, 074	. 95	200	10, 148	4. 44
	4	1, 110	455	22, 593		37, 546	2, 069, 862	23. 99

[1] Exchange rate of peseta: 1924, 13.344 cents; 1925, 14.344 cents.

The existing contract for the output of the Almaden mine was awarded to the present holders by the board of directors of the Almaden and Arrayanes mines after private bids had been submitted. The form of these bids is as follows:

(Name of the individual or company submitting a bid) domiciled at ______ street ______ number ______ floor ______, having been informed of the regulations and conditions as published at the offices of the board of directors of the Almaden and Arrayanes mines, with regard to the sale, at a private bidding, of the mercury production of the Almaden mines during the next season of 1926–27, accepts the said regulations and conditions, and bids (for himself or in the name of ______) for each flask of 34 kilos, 507 grams, the sum of ______ pounds sterling, and offers for the permanent guaranty the guaranty of ______ bank.

(Date and signature) ______.

THE PRESIDENT.
(Signed) ANTONIO DEL CASTILLO.

The form of the contract amounts to the sale of the output at the bidders' price. The grantor states:

1. The object of the said sale shall be the mercury produced by the Almaden mines during the said year. The production is estimated as about 45,000 flasks, of which the board will reserve 500 flasks to take care of industrial requirements.

2. The net and fixed price of each flask of 34 kgs., 507 grams, shall be a minimum of £13 sterling, and all lower bids shall be rejected. The price quoted must be per flask delivered on board car at the stations of Almadenejos or Chillon.

The form of contract also states:

17. The board of directors does not in any manner obligate itself that its 1926–27 production will be exactly 45,000 flasks; on the contrary, it admits the possibility that it may not reach that figure, or even a large part thereof, or that the said production may exceed this figure by a larger or smaller number of flasks.

In the first case, the board waives all responsibility and declares that it does not obligate itself to deliver to the bidder the flasks needed to make up the 45,000, and rejects all claims that may be filed for the delivery of the shortage.

In the second case, the board gives the bidder the option of buying the flasks exceeding the 45,000 estimated at the same price as mentioned in the contract, although the bidder is not obligated to buy the excess quantity.

Evidently the output is not contemplated to exceed 45,000 flasks per annum, and the minimum price is fixed at approximately $63 a flask.

ITALY

In Italy the production of mercury is derived from mines in the districts of Idria and Monte Amiata. The production of the Idria district is not so large as that of the Monte Amiata. So far as can be ascertained, data on the reserves of this district are not available. In the Monte Amiata district the production during the past few years has been continuously increasing. At the present rate of output, the developed ore indicates a life of 10 years, but the date of exhaustion will probably be deferred a long time, because there are comparatively large undeveloped areas impregnated with cinnabar. The developed ore is claimed to have a tenor of 1 per cent and to contain more than 550,000[15] flasks of the metal.

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[15] Reserves estimated by R. Salvadori, manager of Società Monte Amiata, in correspondence with author.

Mercury produced in Italy, 1924-25

Province	Number of mines	Workmen		Tenor of ore (per cent)	Metal produced		
		At mines	At plants		Flasks	Value [1]	Flasks per man
1924 [2]							
Friuli (Trieste)	1	838	140	0. 68	13, 669	$567, 412	13. 98
Grosseto	4	354	174	. 54	5, 673	252, 328	10. 74
Siena	3	914	397	1. 03	28, 895	1, 285, 174	22. 04
	8	2, 106	711	----------	48, 237	2, 104, 914	17. 12
1925							
Friuli (Trieste)	1	812	140	(3)	13, 186	767, 305	13. 85
Grosseto	3	432	133	. 54	5, 850	316, 649	10. 35
Siena	3	977	509	1. 26	34. 862	2, 203, 812	23. 46
	7	2, 221	782	----------	53, 898	3, 287, 766	17. 95

[1] Exchange rate of lira: 1924, 4.358 cents; 1925, 3.978 cents.
[2] Exclusive of a small operation in Roma, where mercury ore was mined.
[3] Data not available.

PERU

Cinnabar occurs at Chonta in Huanuco; also at Huancavelica, in the Department of Huancavelica. Regarding the Chonta district, Miller and Singewald, in The Mineral Deposits of South America, on page 454, say:

> In the Chonta district are three mantos interstratified in sandstone and quartzite, consisting of pyrite, sphalerite, galena, cinnabar, and tetrahedrite. The ore occurs in patches and pockets, connected by small veins of pyrite, and is reported to carry 300 ounces of silver and 10 per cent mercury, and was formerly worked especially for its mercury content.

The Santa Barbara deposit of the Huancavelica district was first worked about 1566 and has been one of the most productive mines in the world. The ore is said to have carried 2 per cent mercury. The mineralized belt is approximately 60 kilometers long and 1 to 3 kilometers wide, and has been productive only near the town of Huancavelica. The mineralization follows a belt of sandstones in limestone. Usually the sandstone is impregnated by the ore, but ore is found in areas where the limestone has been fractured. Since 1839 numerous attempts have been made to exploit the Santa Barbara mine.[16]

In 1915 the property was acquired by Eulogio E. Fernandini, who sank a new shaft and installed modern equipment. A tunnel was driven under the old workings of the Santa Barbara and continued into virgin territory. The result convinced the owner and his engineer that the deposit had been so exhausted by the previous owners that it offered no prospect of profitable exploitation. Work was discontinued in 1926 after Senor Fernandini had expended approximately $543,000 (United States currency).

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[16] De Rivero, M. M., Memoria sobre el Rico Mineral de Azogue de Huancavelica, Lima, 1848; Singewald, J. T., "The Huancavelica mercury deposit, Peru": Eng. and Min. Jour., Sept. 11, 1920, p. 518; Stauss, L. W., "Quicksilver at Huancavelica, Peru": Min. and Sci. Press, Oct. 23, 1909; Umlauff, A. F., "El cinabrio de Huancavelica" bol. 7, Cuerpo de Ing. de Minas del Peru, 1904.

CHINA

The chief producing mercury deposits of China are in the Province of Kweichow. A small production is made in the Province of Hunan. The latest available data give the output of these Provinces in 1925 as 13,816 flasks.[17]

Mercury mining is an ancient industry in China, and at times has employed a large amount of labor. Tegengren, in China Geological Survey Bulletin 2, 1920, page 3, says:

> The occurrences belong to a broad zone, at least 100 kilometers in width, extending northeast-southwest from southeast Szechuan and western Hunan across whole of Kueichow and continuing into Yunnan as far as Mengtz.

The total length is about 700 kilometers. Tegengren also states, on page 35 of the publication already cited:

> In conclusion it may be said that, although very likely there exist neither exceedingly rich nor exceedingly big deposits in the Chinese quicksilver regions, and although many of those hitherto exploited have become impoverished or exhausted, there is little doubt that a systematic geological investigation would reveal deposits sufficiently rich and extensive to maintain for many decades ahead this industry on at least the same level as hitherto. If the mining methods were somewhat modernized, better tools and better explosives used, and if more efficient furnaces were introduced, the quicksilver production would certainly render much more benefit as well to the owners and miners as to the provincial treasury.

The consumption of mercury in China not only absorbs virtually all of the domestic production but necessitates imports. In 1924 the imports in the form of vermilion containing 50 per cent mercury amounted to 3,616 flasks of metallic mercury, and the exports of the same character were 103 flasks metallic mercury. At one time China was the largest importer of mercury produced in the United States. As an example, in 1904 the United States, with a domestic production of 35,315 flasks, shipped 9,000 flasks to Hong Kong, China.

RUSSIA

Russia for many years has made a relatively small production of mercury, all of it from the Ekaterinoslav district.

MEXICO

The principal deposits of mercury in Mexico are at Huitzuco, in the State of Guerrero, and at Guadalcazar, in San Luis Potosi. Promising deposits also exist in Queretaro and Guanajuato; and the States of Morelos, Jalisco, Mexico, Hidalgo, Zacatecas, and Chihuahua possess numerous smaller deposits.

CZECHOSLOVAKIA

For many years ores near Iglo in the West Karpathian Mountains have been worked for their mercury content. In the Thihu Valley in the Karpathians deposits of cinnabar have been worked.

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[17] Hsieh, C. Y., General Statement on the Mining Industry: China Geol. Surv. Special Report No. 2, Peking, 1926.

MANGANESE AND MANGANIFEROUS ORES

By J. W. Furness[1]

INTRODUCTION

In 1926 the domestic production of manganese ore was 46,258 long tons. Imports of manganese ore, exclusive of those from Cuba, contained 347,378 long tons of metallic manganese, estimated to be equivalent to 723,700 tons of manganese ore; the imports from Cuba were 14,112 tons of manganese ore containing 47 per cent of manganese. Imports of ferromanganese contained 47,768 tons of metallic manganese, corresponding to approximately 123,000 tons of manganese ore. Exports of manganese, in terms of the crude-ore equivalent of ferromanganese and spiegeleisen shipped, were estimated to be 1,200 tons. Thus there became available for consumption in the United States in 1926 a new supply approximately equivalent to 906,000 tons of high-grade manganese ore. The imports of manganese in ore in 1926 were the largest so far in the history of this country. The increase may be attributed in part to the larger production of steel but in the main is accounted for by the smaller imports of ferromanganese and the large increase in the domestic manufacture of this alloy.

On December 31, 1925, manganese ores in Government warehouses contained 169,404 tons of metallic manganese, approximately equivalent to 338,800 tons of 50 per cent ore; on December 31, 1926, there was a total of 179,500 tons of metallic manganese in warehouses, equivalent to 359,000 tons of 50 per cent ore. The amount of ferromanganese (manganese content) on the corresponding dates in Government warehouses was 10,184 tons in 1925 and 6,194 tons in 1926.

The outstanding features of the manganese industry of the United States in 1926 were a moderate decline in the production of chemical ore, a smaller production of metallurgical ores, the increased manufacture of ferromanganese, the heavier consumption of ferruginous manganese ore and manganiferous iron ore, and the lighter consumption of spiegeleisen.

Some of the outstanding features of the manganese industry of the world were the increased production in India in spite of curtailed exports, the larger exports from Brazil, the maintenance of production in the Gold Coast, the increased production and export to world markets of the Nikopol deposits in the Ukraine, the heavier shipments from the Netherland East Indies, the development of Australian deposits, resumption of Chilean exports, and the prospective production of South Africa. The industrial depression in England doubtless affected the world's consumption. The price of manganese ore during the year was fairly constant except for a period of depression during the third quarter.

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[1] The statistics in this report were prepared (unless otherwise stated) by H. M. Meyer, and the data on imports and exports were compiled from records of the Bureau of Foreign and Domestic Commerce by J. A. Dorsey, both of the Bureau of Mines.

UNITED STATES

PRODUCTION

Manganese alloys and ore produced in the United States and imported from principal foreign sources, 1917–1926, in long tons

Year	Steel (production) [1]	Ferromanganese		Spiegeleisen		Manganese ore				
		Shipments	Imports	Shipments	Imports	Shipments [2]	Total imports	Imports from—		
								Russia	India	Brazil
1917	45, 060, 607	260, 225	41, 969	189, 241	3, 968	129, 351	629, 972	----------	48, 975	512, 517
1918	44, 462, 432	306, 076	27, 168	263, 861	1, 969	305, 869	491, 303	----------	29, 275	345, 877
1919	34, 671, 232	198, 255	33, 022	90, 855	27	54, 957	333, 344	6, 916	9, 200	246, 592
1920	42, 132, 934	276, 594	59, 254	103, 672	5, 234	94, 420	[3] 599, 764	18, 762	71, 238	421, 523
1921	19, 783, 797	111, 374	9, 077	69, 230	307	13, 531	[3] 392, 606	----------	113, 730	262, 468
1922	35, 602, 926	161, 612	[4] 100, 725	70, 253	8, 151	13, 404	[4] 425, 000	---------- [6] 1, 642	[5] 24, 250 [6] 298	[5] 234,598 [6] 40, 595
1923	44, 943, 696	226, 365	[4] 113, 833	134, 086	4, 668	31, 500	[4] 419, 000	[7] 11, 670	[7] 25, 568	[7] 88, 036
1924	37, 931, 939	232, 821	[4] 56, 588	76, 179	7, 433	56, 515	[4] 505, 000	[7] 41, 097	[7] 54, 566	[7] 54, 938
1925	45, 393, 524	254, 005	[4] 78, 713	95, 890	1, 090	98, 324	[4] 615, 000	[7] 114, 537	[7] 23, 504	[7] 109,650
1926	48, 293, 763	330, 070	[4] 59, 710	82, 982	8, 783	46, 258	[4] 738, 000	[7] 122, 345	[7] 30, 596	[7] 130, 698

[1] According to American Iron and Steel Institute.

[2] Exclusive of small quantities of ore shipped for use in fluxing.

[3] Exclusive of 7,173 tons in 1920 and 8,748 tons in 1921 reported by Bureau of Foreign and Domestic Commerce as manganese ore. The value of this "ore" ranged from $46 to $292 a ton; consequently the Bureau of Mines believes that the figures represent imports of ferromanganese, spiegeleisen, manganese chemicals, and perhaps some chemical ore.

[4] Prior to Sept. 22, 1922, the Bureau of Foreign and Domestic Commerce reported the gross weight of manganese ore and ferromanganese imported, but since that date has reported only the manganese content. This figure is a Bureau of Mines estimate of the gross weight of ore or alloy imported. For the figures reported by the Bureau of Foreign and Domestic Commerce, see the tables on pp. 148 and 149.

[5] Jan. 1 to Sept. 21, 1922. Figures represent gross weight of manganese ore imported.

[6] Sept. 22 to Dec. 31, 1922. Figures represent manganese content of ore imported.

[7] Figures represent manganese content of ore imported.

Manganese and manganiferous ore shipped from mines in the United States, 1916–1926, in long tons

Year	Manganese and manganiferous ores, exclusive of fluxing ore			Fluxing ore containing manganese		
	Ore containing 35 per cent of manganese or more	Ore containing 10 to 35 per cent of manganese	Ore containing 5 to 10 per cent of manganese	Ore containing 35 per cent of manganese or more	Ore containing 10 to 35 per cent of manganese	Ore containing 5 to 10 per cent of manganese [1]
1916	31, 474	316, 600	81, 615	------------	137, 253	8, 858
1917	129, 351	576, 608	108, 409	54	154, 151	21, 776
1918	305, 869	818, 003	236, 103	------------	98, 160	18, 196
1919	54, 957	211, 632	112, 303	365	98, 202	11, 596
1920	94, 420	357, 279	279, 687	------------	123, 970	6, 728
1921	13, 531	8, 439	62, 670	------------	22, 962	3, 028
1922	13, 404	344, 674	251, 614	2, 278	27, 705	1, 666
1923	31, 500	319, 666	1, 072, 457	769	40, 770	1, 004
1924	56, 515	286, 470	587, 026	1, 833	24, 972	------------
1925	98, 324	267, 252	1, 153, 268	------------	25, 384	2, 150
1926	46, 258	364, 312	835, 412	------------	17, 707	------------

[1] Includes ore containing less than 5 per cent of manganese, as follows: 1916, 1,026 tons; 1917, 141 tons; 1918, 1,684 tons; 1919, 844 tons; 1920, 1,250 tons; 1921, 998 tons; 1922, 117 tons.

Manganese and manganiferous ore (exclusive of fluxing ore) shipped from mines in the United States, 1923–1926, by States

	Ore containing 35 per cent or more of manganese			Ore containing 10 to 35 per cent of manganese			Ore containing 5 to 10 per cent of manganese		
	Shippers	Long tons	Value	Shippers	Long tons	Value	Shippers	Long tons	Value
1923									
Metallurgical	32	11,060	$188,748	41	319,666	$1,158,628	12	1,072,457	$3,598,327
Chemical	4	20,440	686,225						
	36	31,500	874,973	41	319,666	1,158,628	12	1,072,457	3,598,327
1924									
Metallurgical	35	31,878	441,014	55	286,470	929,390	12	587,026	1,713,943
Chemical	4	24,637	866,463						
	39	56,515	1,307,477	55	286,470	929,390	12	587,026	1,713,943
1925									
Metallurgical:									
Alabama	2	938	12,544	5	298	3,087			
Arizona	3	294	5,102						
Arkansas	4	3,517	79,335	9	5,076	23,140			
California	3	869	17,525						
Colorado	1	743	5,127	5	7,352	26,565			
Georgia	8	1,649	20,281	20	28,038	133,215	5	7,349	23,397
Massachusetts	1	(1)	(1)	1	(1)	(1)			
Michigan				2	98,753	(1)			
Minnesota				3	77,665	184,121	4	741,409	1,577,301
Montana	4	55,659	585,031						
Nevada	2	850	(1)	1	6,659	(1)			
New Mexico	2	1,588	(1)	2	40,848	153,251			
North Carolina	2	(1)	(1)						
Tennessee	1	352	8,800	1	(1)	(1)			
Utah	1	50	(1)	3	666	5,754	1	496	(1)
Virginia	3	1,499	22,981	1	1,800	(1)			
Washington	1	8,113	(1)						
Wisconsin							1	404,014	(1)
Undistributed		52	198,073		97	386,183			1,198,705
Total metallurgical	38	76,173	954,799	53	267,252	915,316	11	1,153,268	2,799,403
Chemical:									
Montana	3	20,529	825,970						
Virginia	1	1,622	77,000						
Total chemical	4	22,151	902,970						
	42	98,324	1,857,769	53	267,252	915,316	11	1,153,268	2,799,403
1926									
Metallurgical:									
Alabama	2	896	(1)	5	1,018	6,421			
Arizona	2	2,684	(1)	1	46	(1)			
Arkansas	4	2,450	64,010	12	8,195	47,428			
California	3	393	8,750						
Colorado				2	2,925	(1)			
Georgia	5	3,251	29,890	17	18,414	121,773	2	6,547	(1)
Idaho	1	800	(1)	2	351	(1)			
Massachusetts				1	(1)	(1)			
Michigan				2	107,202	(1)			
Minnesota				2	158,759	(1)	5	799,458	1,791,350
Montana	3	5,713	44,226						
Nevada	1	1,607	(1)	4	12,205	58,941			
New Mexico	1	1,966	(1)	2	52,033	(1)	1	29,407	(1)
North Carolina	1	55	(1)						
Tennessee	2	1,555	(1)	1	953	(1)			
Utah				1	(1)	(1)			
Virginia	4	1,998	40,242	2	2,135	(1)			
Washington	1	3,162	(1)						
Undistributed			192,775		76	944,866			143,031
Total metallurgical	30	26,530	379,893	54	364,312	1,179,429	8	835,412	1,934,381
Chemical:									
Idaho	1	30	848,770						
Montana	13	17,904							
Virginia	1	1,794							
Total chemical	15	19,728	848,770						
	45	46,258	1,228,663	54	364,312	1,179,429	8	835,412	1,934,381

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[1] Included under "Undistributed."

In 1926 the domestic mines of the United States shipped 46,258 long tons of manganese ore, valued at $1,228,663, a decrease of 53 per cent as compared with 98,324 tons shipped in 1925. In 1925, 22,151 tons of chemical ore, valued at $902,970, were shipped and in 1926, 19,728 tons, valued at $848,770; thus the metallurgical ore shipped in 1925 was 76,173 tons and in 1926, 26,530 tons.

In 1925 the Emma mine at Butte, Mont., shipped 47,469 tons of carbonate ore and in 1926, 1,263 tons. It is believed that the Anaconda Copper Mining Co. would have continued production from the Emma mine at relatively the same rate as in 1925 if satisfactory sales contracts could have been obtained. The development work carried on in conjunction with the mining of the ore produced by this company in 1925 exposed enough ore to maintain the estimates of reserves of 1924 in spite of subsequent shipments from the Emma mine.

At other productive manganese mines, however, it is probable that ores available at the relatively constant price level prevailing during the years 1924–1926 have been materially depleted. This is evidenced by the decreased production in Arkansas (Batesville-Cushman district) and by the cessation of mining in Leadville, Colo. Production of chemical ores decreased in 1926, although the price has been relatively constant. During the past four years the price of dioxide ores has been approximately $75 a ton for ore containing in excess of 80 per cent manganese dioxide (MnO_2). Of the output of chemical ore in 1926, the Philipsburg area of Montana produced 90.8 per cent, Virginia 9.1 per cent, and Idaho the rest, 0.1 per cent.

MANGANESE ORE

The chapter on "Manganese and manganiferous ores," Mineral Resources for 1925, indicated that a decline in domestic production was probable. This probability has become a fact. In 1925 the production was 76,173 tons; in 1926, 26,530 tons. In 1925 the shipments of the Butte district, Montana, were 47,507 tons of rhodochrosite, or 62.4 per cent of the total domestic production of metallurgical ore; in 1926 the shipments from that district were 1,263 tons, or 5 per cent of the domestic total. Thus it can be seen that the large decline in production in 1926 must be attributed in the main to the smaller amount shipped from the Butte area. A comparison of production in the two years brings out the fact that even if the Butte area had produced as much in 1926 as in 1925, the shipments of 1926 would still have been 3,399 tons, or 4 per cent, less than those of 1925. If the production of the Butte area is not considered, the domestic production was 28,666 tons in 1925 and 25,267 tons in 1926, a decrease of 3,399 tons, or 12 per cent. Apparently, the decrease in the production of metallurgical ore in 1926 may be attributed to the following causes: During the past three years the price of manganese ore has remained relatively constant at 40 cents per unit c. i. f. Atlantic seaboard. During these years the production was 31,878 tons in 1924; 76,173 tons (47,507 tons rhodochrosite and 28,666 tons of oxide) in 1925; and 26,530 tons in 1926. These figures apparently show a decline of production with a rather small range of prices; the uncertainty of the supply (as may be illustrated by the cessation of shipments from the Crescent mine, Olympic Peninsula, Washington), and the seeming exhaustion, at current prices, of the Leadville, Colo., ores, and the Butte, Mont., rhodochrosite. The shipments of ore from Idaho and New Mexico come from properties where the reserves are fractional in comparison with the annual consumption of the United States. In the production of manganese ore the United States is, the author believes, rapidly approaching a point where materially higher prices will not, relatively speaking, increase production; the hope of maintaining or increasing domestic production lies in solving the metallurgical problems involved in the beneficiation of low-grade manganese ores.

These low-grade manganiferous and ferruginous ores are found mainly in the Lake Superior region, in Colorado, and in New Mexico; the rhodonite and rhodochrosite in Montana; and the bementite in the mineralized area of the Olympic Peninsula. The major part of the reserves of the Lake Superior region is in the Cuyuna range, and their utilization in the manufacture of ferromanganese involves the problem of separating the manganese from the associated iron and phosphorus, and of eliminating present wastes in the use of these ores. A thorough investigation by the northwest experiment station, at Minneapolis, has shown that it is not feasible to concentrate these ores either by gravity methods or by magnetic separation following a reducing roast. The Butte area of Montana contains large quantities of a mixture of carbonates and silicates of manganese and quartz and the problem is to separate the two manganese minerals, rhodochrosite and rhodonite, in order to utilize either or both of them for chemical or metallurgical purposes. The low phosphorus content and low ratio of iron to manganese in these minerals favor their utilization in the production of ferromanganese. Regarding the reserves, Pardee,[2] after mentioning the reserves of what is now commercial ore, says: "In addition, the lodes contain an almost unlimited quantity of low-grade material consisting of carbonates and silicates of manganese and quartz mixed in different proportions. This constitutes a reserve from which, if the necessity arose, the country's needs might be largely supplied. With improvements in the methods of reduction, much of it might even become valuable under ordinary conditions." There seems little question that at depth in the Philipsburg district, Montana, large amounts of the carbonates of manganese will be encountered. The problems presented by the Colorado ores, largely those of Leadville and possibly of Red Cliff, are metallurgically like those of the Cuyuna range ores.

In the chapter on manganese, in Mineral Resources for 1925, attention was called to certain areas in the Olympic Mountains, Wash., where considerable prospecting in 1923, 1924, and 1925 has indicated extensive deposits of bementite, a manganese silicate ($2MnSiO_3.H_2O$).

In California, without exception, deep mining has shown that the oxide of manganese found near the surface gives way to silicates and carbonates, as, for example, at the Ladd mine in San Joaquin County. The evidence at hand indicates that solution of the problem of rendering this ore metallurgically available will result in the development of large tonnages.

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[2] Pardee, J. T., "Deposits of manganese ore in Montana, Utah, Oregon, and Washington"; Contributions to Economic Geology: U. S. Geol. Survey Bull. 725, 1921, p. 176.

In Nevada are large bodies of ferruginous manganese ore. Some of the ore of this type mined in the Pioche district in 1926 was utilized as a flux; but the larger part was utilized at Provo in the manufacture of pig iron.

If the manganese in the Utah ferruginous and manganiferous deposits were rendered available for the manufacture of high-grade steel, the domestic output of manganese would be increased materially.

Comparatively large reserves of ferruginous and manganiferous ores occur in Grant County, N. Mex. The utilization of these ores presents problems similar to those of the Cuyuna ores of Minnesota.

In the Batesville-Cushman district, Arkansas, there are large unknown tonnages of what is known as Cason shale, in which "manganese buttons" occur. An analysis[3] of the shale from which the "buttons" were removed is as follows: Manganese (Mn), 5.87 per cent; iron (Fe), 4.98 per cent; silica (SiO_2), 32.73 per cent; alumina (Al_2O_3), 8.22 per cent; lime (CaO), 14.22 per cent; magnesia (MgO), 3.38 per cent; barium (Ba), SO_4, and CO_3 present.

In the Appalachian range there are manganiferous iron ores which present problems identical to those of similar Lake Superior ores.

During the past few years the Northwest experiment station of the Bureau of Mines has been investigating the question of how the manganese in ores that are both ferruginous and manganiferous can be made available in the manufacture of ferromanganese. At the University of Minnesota during 1926 the Bradley-Fitch Co. has been operating a pilot plant using a hydrometallurgical process for treating ferruginous manganese ore. The product of this plant is a relatively pure manganese oxide.

FERRUGINOUS MANGANESE ORE

Shipments of domestic ore carrying 10 to 35 per cent manganese increased from 267,252 tons, valued at $915,316, in 1925 to 364,312 tons, valued at $1,179,429, in 1926. This increase was due mainly to the production in Minnesota and New Mexico, for the output in Colorado and Georgia decreased.

In 1925 the Cuyuna range, Minnesota, contributed 77,665 tons, the product of three mines. In 1926 there were two producing properties which contributed 158,759 tons. In 1918 there were 12 producing properties which contributed 625,009 tons.

MANGANIFEROUS IRON ORE

In 1926 the domestic shipments of manganiferous iron ore containing 5 to 10 per cent of manganese decreased 28 per cent from those of 1925. Total shipments of this class of ore were 835,412 tons, valued at $1,934,381, compared with 1,153,268 tons, valued at $2,799,403, in 1925. Shipments from Minnesota increased from 741,409 tons in 1925 to 799,458 tons in 1926. According to the classification used by the Bureau of Mines no manganiferous iron ore was shipped in 1926 from Wisconsin; shipments in 1925 were 404,014 tons. However, 247,261 tons of iron ore containing somewhat less than 5 per cent manganese were shipped in 1926. This ore was used in the manufacture of pig iron.

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[3] Miser, H. D., Deposits of Manganese Ore in the Batesville District, Arkansas: U. S. Geol. Survey Bull. 734, 1922, p. 139.

A. W. Smith[4] summarizes the advantages and disadvantages in using manganiferous iron ores in the manufacture of pig, as follows:

Advantages—
1. Elimination of sulphur.
2. Purifying action in the bath, which tends to produce a better quality steel.
3. Saving of ferromanganese.
4. Decreased lime charge and the saving of fluorspar.
5. Increased tonnage.

Disadvantages—
1. The disadvantages in the blast-furnace operation.
2. The metallic loss in the open-hearth practice.
3. The increased corroding action on open-hearth basic refractories and ladle refractories.

Advantages and disadvantages in using manganese in blast-furnace mixes, which result in a pig iron with a content of approximately 1.5 to 2 per cent manganese—

Advantages—
1. The higher manganese tends to increase the rate of driving, which is due to a more fluid iron.
2. Troubles due to high bottoms are reduced.
3. Less runner and ladle scrap is produced in the manufacture of high-manganese iron than with low-manganese iron.
4. As a general rule, higher blast temperature can be used if the manganese of the pig is not carried too high. Lower coke consumption is obtained than in the production of lower manganese pig iron.
5. With better furnace operations, less flue dust is produced.
6. Owing to the affinity of manganese for sulphur, the use of high-manganese iron will enable the open hearth to produce steel of lower sulphur content.

Disadvantages—
1. The irregular manganese content in the ore over a period of one ore season, which as a rule results in an irregular content of manganese in the pig iron produced, inasmuch as ordinary iron ores are not classified on a manganese basis.
2. If pig iron is produced with excessive manganese content, the furnace bottom is liable to become low and frequent break-outs may occur, due to the extremely bad cutting action on the brickwork of the furnace.

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[4] Smith, A. W., "High-manganese pig iron and manganiferous ores in open-hearth practice": Iron Age, vol. 118, Oct. 28, 1926, p. 1193.

IMPORTS

Manganese ore imported into the United States, 1923–1926

[General imports]

Country	1923		1924		1925		1926	
	Manganese content (long tons)	Value	Manganese content (long tons)	Value	Manganese content (long tons)	Value	Manganese content (long tons)	Value
Africa (British):								
South	----------	----------	----------	----------	----------	----------	6,214	$39,683
West	27,965	$297,376	23,034	$266,216	31,750	$322,360	48,295	1,088,390
Argentina	928	20,040	----------	----------	----------	----------	----------	----------
Brazil	88,036	1,454,790	54,938	1,392,536	109,650	2,755,876	130,698	3,428,740
Canada	----------	----------	60	3,222	1,199	49,406	200	9,841
Chile	789	16,772	1,178	37,858	3,434	64,608	3,942	100,478
China	1	55	----------	----------	245	12,000	----------	----------
Cuba	(1)	137,016	(1)	347,874	(1)	253,315	(1)	224,523
Germany	146	14,654	48	5,659	46	6,195	72	8,976
Hong Kong	20	1,020	278	8,838	622	22,528	----------	----------
India (British)	25,568	625,299	54,566	1,340,119	23,504	550,871	30,596	899,161
Italy	----------	----------	----------	----------	----------	----------	2,920	76,263
Java and Madura	6	369	----------	----------	----------	----------	285	4,159
Netherlands	26	1,664	3,632	153,709	5	637	12	1,327
Norway	----------	----------	----------	----------	----------	----------	1,700	133,528
Oceania (French)	(2)	36	----------	----------	----------	----------	----------	----------
Panama	400	5,300	----------	----------	----------	----------	----------	----------
Russia in Europe	11,670	262,790	41,097	1,050,832	114,537	4,101,070	122,345	5,046,176
Turkey:								
In Europe	38,139	914,156	52,557	1,429,788	----------	----------	----------	----------
In Asia	3,005	86,798	----------	----------	----------	----------	----------	----------
United Kingdom [3]	287	36,375	5	209	1,572	119,788	99	9,886
	[4] 196,986	3,874,510	[4] 231,393	6,036,860	[4] 286,564	8,258,654	[4] 347,378	11,071,131

[1] The imports from Cuba are recorded as 9,062 long tons of ore in 1923; 23.065 tons in 1924; 12,745 tons in 1925; and 14,112 tons in 1926; manganese content not shown. Producers of manganese ore in Cuba report that approximately 23,000 long tons of ore were exported to the United States in 1925, of which 4,500 tons were shipped late in December.

[2] Less than 1 ton.

[3] Recorded as England prior to 1925.

[4] Exclusive of the manganese content of Cuban ores.

FERRO-ALLOYS

PRODUCTION

Ferromanganese.—In 1926 the domestic manufacturers of ferromanganese made a larger output than in any previous year. The amount of crude ore of foreign origin utilized in the manufacture of 1 ton of ferromanganese was 1.949 tons and of ore of domestic and foreign origin 2.063 tons.

Spiegeleisen.—The domestic production of spiegeleisen in 1926 was 74,581 tons containing 14,717 tons of metallic manganese, and the shipments were 82,982 tons containing 16,377 tons of metallic manganese. In 1925 the domestic production was 65,759 tons containing 12,491 tons of metallic manganese, and the shipments were 95,890 tons containing 18,248 tons of metallic manganese. In the production of spiegeleisen in 1926 there were used 149,374 tons of zinc residuum which contained about 12 per cent of manganese and 42 per cent of iron, 203 tons of manganese ore, 760 tons of iron ore, and 229 tons of scrap.

Ferromanganese and spiegeleisen shipped from furnaces in the United States, 1919–1926

Year	Ferromanganese		Spiegeleisen	
	Long tons	Value	Long tons	Value
1919	198, 255	$27, 093, 816	90, 855	$3, 965, 754
1920	[1] 276, 594	41, 840, 690	103, 672	5, 289, 049
1921	[1] 111, 374	13, 654, 800	[2] 69, 230	2, 838, 692
1922	[1] 161, 612	10, 673, 638	70, 253	2, 162, 836
1923	226, 365	23, 853, 313	134, 086	4, 547, 113
1924	[1] 232, 821	23, 533, 668	76, 179	2, 354, 731
1925	[1] 254, 005	26, 006, 439	95, 890	2, 407, 226
1926	330, 070	31, 711, 871	82, 982	2, 016, 088

[1] Includes a small quantity of silicomanganese.
[2] Includes a small quantity of silicospiegel.

IMPORTS

During 1926 the imports of ferromanganese for consumption were lower than those during any year since 1921, with the exception of 1924. The only countries able to ship ferromanganese into the United States under the conditions existing after August, 1926, were, broadly speaking, Norway and Canada. In these countries the ferromanganese manufactured for export is the product of the electric furnace.

According to the Bureau of Foreign and Domestic Commerce, the imports of ferromanganese and other alloys (general imports) in 1926 amounted to 43,932 tons of actual manganese content and originated as follows: Canada, 18,792 tons; Norway, 18,596 tons; United Kingdom, 5,740 tons; other countries, 804 tons. Imports from Canada and Norway amounted to 85 per cent of the total.

Ferromanganese and spiegeleisen imported for consumption in the United States, 1919–1926

Year	Ferromanganese		Spiegeleisen	
	Long tons	Value	Long tons	Value
1919	33, 022	$4, 283, 541	27	$1, 018
1920	59, 254	7, 775, 278	5, 234	277, 900
1921	9, 077	888, 419	307	10, 472
1922 Jan. 1–Sept. 21	72, 136	6, 125, 469	3, 899	268, 135
1922 Sept. 22–Dec. 31	[1] 22, 871		4, 252	
1923	[1] 91, 066	8, 357, 023	4, 668	165, 791
1924	[1] 45, 270	3, 844, 474	7, 433	235, 566
1925	[1] 62, 970	6, 033, 147	1, 090	39, 841
1926	[1] 47, 768	4, 410, 142	8, 783	256, 714

[1] Figures prior to Sept. 22, 1922, represent gross weight of the ferromanganese, but since that date represent the manganese content only.

Manganese alloys imported into and made from domestic and imported ores in the United States, 1920–1926, in long tons [1]

	1920		1921		1922		1923		1924		1925		1926	
	Alloy	Manganese	Alloy	Manganese	Alloy	Manganese	Alloy	Manganese	Alloy	Manganese	Alloy	Manganese	Alloy	Manganese
Ferromanganese:														
Imported	59,254	47,403	9,077	7,262	100,725	80,580	113,833	91,066	56,588	45,270	78,713	62,970	59,710	47,768
Domestic production [2]	294,603	209,496	104,129	79,319	150,010	117,836	251,938	196,844	211,965	165,776	259,780	205,046	318,052	252,066
From domestic ore [3]	42,815	27,900	10,838	7,419	2,547	2,017	13,070	10,008	7,352	5,600	14,910	11,592	13,495	10,541
From imported ore [3]	251,788	181,596	93,291	71,900	147,463	115,819	238,868	186,836	204,613	160,176	244,870	193,454	304,557	241,525
Total	353,857	256,899	113,206	86,581	250,735	198,416	365,771	287,910	268,553	211,046	338,493	268,016	377,762	299,834
Ratio (per cent) of manganese in ferromanganese of domestic origin to total manganese in ferromanganese made and imported		10.9		8.6		1.0		3.5		2.7		4.3		3.52
Number of plants making ferromanganese	20		12		6		12		11		8		8	
Spiegeleisen:														
Imported	5,234	1,047	307	61	8,151	1,630	4,668	934	7,433	1,487	1,090	218	8,783	1,757
Domestic production [2]	111,447	21,006	56,495	9,462	72,974	11,668	129,683	20,410	107,067	17,731	65,759	12,491	74,581	14,717
From domestic ore [3]	96,727	18,257	48,895	7,975	70,374	11,365	126,424	20,026	103,617	17,306	65,759	12,491	74,096	14,627
From imported ore [3]	14,720	2,749	7,600	1,487	2,600	303	3,259	384	3,450	425			485	90
Total	116,681	22,053	56,802	9,523	81,125	13,298	134,351	21,344	114,500	19,218	66,849	12,709	83,364	16,474
Ratio (per cent) of manganese in spiegeleisen of domestic origin to total manganese in spiegeleisen made and imported		82.8		83.7		85.5		93.8		90.1		98.3		88.79
Number of plants making spiegeleisen	10		6		4		7		6		2		2	
Total available supply of metallic manganese as alloys		278,952		96,104		211,714		309,254		230,264		280,725		316,308
Percentage of total manganese imported as alloys		17.4		7.6		38.9		29.8		20.3		22.5		15.66
Ratio (per cent) of manganese in ferromanganese made from imported ore to total available supply of manganese in alloys		65.1		74.8		54.7		60.4		69.6		68.9		76.36
Ratio (per cent) of manganese in spiegeleisen made from imported ore to total available supply of manganese in alloys		1.0		1.6		.1		.1		.2				.03
Ratio (per cent) of manganese in ferromanganese made from domestic ore to total available supply of manganese in alloys		10.0		7.7		.9		3.2		2.4		4.1		3.33
Ratio (per cent) of manganese in spiegeleisen made from domestic ore to total available supply of manganese in alloys		6.5		8.3		5.4		6.5		7.5		4.5		4.62
Ratio (per cent) of total manganese in alloys made from domestic ore to total available supply of manganese in alloys		16.5		16.0		6.3		9.7		9.9		8.6		7.95
Percentage of total manganese made and imported as spiegeleisen		7.9		9.9		6.3		6.9		8.3		4.5		5.21
Total open-hearth and Bessemer steel	41,554,982		19,605,740		35,228,281		44,383,745		37,476,940		44,758,450		47,626,547	

[1] Table prepared by H. W. Davis.

[2] Quantity made.

[3] Partly estimated.

PRICES

The keen competition indicated by the acquisition of foreign manganese deposits by citizens of the United States, the manufacture of ferromanganese in Norway and Canada from ores of the Gold Coast, and the entrance of a large producer of steel as a seller of ferromanganese in the open market caused prices to fall from $119.79 in December, 1925, to $80 in July, 1926. These prices were for alloy delivered in Pittsburgh. The duty on 80 per cent ferromanganese is 1⅞ cents per pound on the content of metallic Mn, or $33.60 a ton.

Prices per long ton of ferromanganese, spiegeleisen, and manganese ore in the United States, 1921–1926[1]

Month	Ferromanganese (80 per cent) (delivered at Pittsburgh)					
	1921	1922[2]	1923[2]	1924[2]	1925[2]	1926[2]
January	$101.00	$61.90	$109.79	$113.79	$116.79	$119.79
February	96.85	65.32	112.29	112.29	119.79	119.79
March	89.00	67.82	120.79	112.29	119.79	102.29
April	87.50	69.07	124.79	112.29	119.79	92.79
May	83.00	72.32	129.79	112.29	119.79	92.79
June	76.50	72.82	129.79	112.29	119.79	92.79
July	75.00	72.29	122.29	110.79	119.79	92.79
August	70.75	72.29	122.29	98.79	119.79	92.79
September	64.75	80.59	114.79	97.79	119.79	92.79
October	61.65	105.47	112.79	104.79	119.79	99.79
November	60.00	104.92	113.79	107.29	119.79	104.79
December	60.00	104.92	113.79	109.79	119.79	104.79

Month	Spiegeleisen (20 per cent) (at producers' furnaces)					
	1921	1922	1923	1924	1925	1926
January	$46.25	$25.50	$34.90	$39.00	$32.00	$34.00
February	37.75	28.00	35.75	39.00	33.00	34.00
March	34.20	28.00	37.25	38.00	33.00	34.00
April	32.00	30.00	39.25	36.00	33.00	34.00
May	31.75	30.00	43.00	36.75	33.00	34.00
June	29.60	35.25	46.00	36.00	32.00	34.00
July	27.50	35.00	45.00	35.00	31.50	34.00
August	26.20	37.00	45.00	32.50	32.25	34.00
September	25.25	38.00	43.50	32.00	33.00	34.00
October	24.85	37.75	40.00	31.00	33.00	34.00
November	25.00	36.80	39.00	31.75	34.00	38.75
December	25.00	35.50	38.00	31.00	34.00	37.00

Month	Manganese ore (50 per cent)					
	1921	1922[3]	1923[3]	1924[3]	1925[3]	1926[3]
January	$18.75	$10.50	$29.45	$31.20	$32.20	$30.70
February	17.50	11.00	29.45	32.70	32.70	30.70
March	17.25	12.50	31.70	32.20	33.20	30.70
April	14.00	12.75	33.20	32.20	33.20	30.70
May	14.00	12.75	32.70	32.20	32.70	30.70
June	12.50	13.25	32.95	31.70	32.20	30.70
July	12.50	13.50	32.95	30.70	32.20	30.70
August	12.50	13.75	32.95	30.20	32.20	30.70
September	12.50	14.35	31.70	30.20	31.70	30.70
October	12.50	25.50	31.70	30.20	31.70	30.70
November	12.50	25.50	31.70	31.70	31.70	30.70
December	12.00	25.50	31.70	32.20	31.70	30.70

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[1] Iron Trade Review.

[2] Beginning with Sept. 22, 1922, a duty of 1⅞ cents a pound of contained manganese was placed on ferromanganese imports.

[3] Beginning with Sept. 22, 1922, a duty of 1 cent a pound was placed on the metallic content of imported manganese ore. This amounts to $11.20 a ton on 50 per cent ore.

In the past large manufacturers, such as the United States Steel and the Bethlehem Steel corporations, imported high-grade manganese ore and made some of it into ferromanganese, chiefly for their own use. Other steel manufacturers obtained ferromanganese from the small supply of domestic manufacturers and the large imports from England and Germany. In 1926 the Bethlehem Steel Corporation placed ferromanganese on the market, and the resulting competition caused the drop in price mentioned. At $80 a ton, duty paid, manufacturers of ferromanganese in England and Germany could not compete in the United States market. The condition outlined resulted in a record-breaking production of ferromanganese in the United States.

The table following indicates the increased production of ferromanganese during the period mentioned and the trend of the domestic production of manganese ore under the tariff:

Ferromanganese and manganese ore produced in and imported into the United States under the tariff act of 1922, in long tons

Year	Ferromanganese			Manganese ore		
	Domestic shipments	Imports[1]	Duty collected	Domestic shipments	Imports[1]	Duty collected
1922	161,612	100,725	[2] $962,037.45	13,404	425,000	[2] $405,977.60
1923	226,365	113,833	3,834,392.70	31,500	419,000	1,659,638.40
1924	232,821	56,588	1,905,643.65	56,515	505,000	4,780,832.00
1925	254,005	78,713	2,652,841.80	98,324	615,000	6,078,352.00
1926	330,070	59,710	1,822,746.00	46,258	738,000	7,935,729.60

[1] The Bureau of Foreign and Domestic Commerce has reported only the manganese content of ferromanganese and manganese ore imported since Sept. 22, 1922. These figures are Bureau of Mines estimates of the gross weight of ore or alloy imported.

[2] Tariff became effective Sept. 22, 1922; shipments and imports cover entire year.

In the summer of 1926 the price of ferromanganese dropped from $119.79 to $80 a ton, remained there a few weeks, and subsequently advanced to $100 a ton. As, broadly speaking, 2¼ tons of crude ore, 50 per cent tenor, are required to produce 1 ton of ferromanganese containing 80 per cent Mn, it seems evident that with a duty of $11.20 per ton on crude ore or $33.60 on ferromanganese, with a world price of 40 cents per unit on manganese ore (equivalent to $20 a ton for 50 per cent ore), foreign manufacturers of ferromanganese can not compete in the domestic market unless they can purchase ore for much less than the published world prices.

CONSUMPTION

The table following shows that Russia and Brazil furnished approximately 84 per cent of the manganese ore imported and utilized in the manufacture of ferromanganese in 1926. As has been stated, our imports of ore in 1926 amounted to about 738,000 tons. The total manganese ore of foreign origin used was 620,100 tons. Of the total imports, 203 tons were used in the manufacture of spiegeleisen in 1926. The difference between the stocks in Government warehouse on December 31, 1925, and December 31, 1926, was an accumulation of about 20,000 tons, thus indicating that in 1926 some 98,000 tons were either added to stocks in the hands of consumers or utilized in the manufacture of silicomanganese, dry batteries, chemical compounds, bricks, glass, and other commodities. During the year approximately 20 per cent of the total tonnage of ore imported and utilized in the manufacture of ferromanganese was imported from Brazil and had a tenor of approximately 40 per cent Mn (dry). All other ores imported had a tenor in excess of 46 per cent Mn (dry).

Foreign manganese ore used in manufacture of ferromanganese in the United States, 1925–26, in long tons[1]

Source of ore	1925	1926
Africa	33, 582	42, 692
Brazil	207, 238	237, 358
Chile	2, 062	5, 653
China	606	----------
Cuba	10, 543	18, 372
India	68, 326	31, 667
Porto Rico	2, 776	1, 202
Russia	194, 006	282, 954
	519, 139	619, 898

[1] Table compiled by H. W. Davis.

SILICOMANGANESE AND SILICOSPIEGEL

The fact that trade of the United States demands certain grades of steel prohibits, possibly from lack of metallurgical knowledge, the utilization of any large quantity of silicomanganese or silicospiegel. In other words, the physical qualities imparted to steel by the utilization of silicomanganese and silicospiegel do not, broadly speaking, meet with present trade requirements. From time to time it has been suggested that, because of our large reserves of the silicates of manganese (rhodonite and bementite), alloys manufactured from these ores be substituted for ferromanganese and spiegel. It seems possible that the consumption of imported manganese ore could be curtailed somewhat should this suggestion be followed. For many years the French have been manufacturing silicomanganese in a small way from domestic and also from imported ores. In the Hautes-Pyrenees rhodonites are utilized; the ore is treated in electric ovens at Villelongue and yields a product containing 20 to 25 per cent of silicon, 52 to 65 per cent of manganese. The silicospiegel manufactured contains 10 to 12 per cent silicon, 18 to 20 per cent manganese. The production of the Pyrenees is small. The average analysis[5] of the manganese ore produced, when dried at 110° C., is reported as follows: MnO, 31.50 per cent; MnO_2, 8.95 per cent; SiO_2, 15.30 per cent; Fe_2O_3, 3.04 per cent; Al_2O_3, 4.56 per cent; P, 0.084 per cent; CaO, 7.70 per cent; MgO, 0.60 per cent; S, 0.24 per cent; As, 0.06 per cent; Pb, 0; Zn, traces; Cu, 0; BaO, 0.

The manufacture is extremely simple and is based on the reaction between carbon, coke, or anthracite and the rhodonite ores. A mixture of ore and anthracite, as an example, is placed in an electric furnace and power applied. The amount of power consumed varies greatly, according to the quality of the ore used.

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[5] Data prepared in office of commercial attaché, American Embassy, Paris, France, Apr. 9, 1926, and Apr. 12, 1926.

Ferrosilicon has been found most effective in the foundry rather than in steel works. The disadvantages of using silicon in the manufacture of steel are:

(1) Use in excess causes large pipes in the ingots; (2) products of oxidation may remain in the steel; (3) silicon has no effect on "red shortness" caused by sulphur; (4) silicon has no effect on molecular disarrangement of the metal.

The firms that made or shipped ferromanganese and spiegeleisen in 1926 are listed below (f indicates ferromanganese; s, spiegeleisen):

(f) Anaconda Copper Mining Co., Great Falls, Mont.
(f) Bethlehem Steel Co., Sparrows Point, Md.
(fs) Bethlehem Steel Co., Johnstown, Pa.
(f) Electro Metallurgical Co., Niagara Falls, N. Y.
(s) Jackson Iron & Steel Co., Jackson, Ohio.
(f) Lavino Furnace Co., Marietta, Pa., and Reusens, Va.
(fs) Lavino Furnace Co., Sheridan, Pa.
(s) New Jersey Zinc Co., Palmerton, Pa.
(f) Tennessee Coal, Iron & Railroad Co., Bessemer, Ala.
(f) United States Steel Corporation, Etna and Pittsburgh, Pa.

MANGANIFEROUS ZINC RESIDUUM

The manganiferous residuum obtained from the roasting of zinc ore in the United States is derived solely from the franklinite mined at Franklin Furnace, N. J. The major part of the residuum contains 12 to 14 per cent manganese and approximately 40 per cent iron and the smaller part approximately 7 per cent manganese. The residuum of higher grade is used for the manufacture of spiegeleisen; the lower grade in the manufacture of pig iron. In 1926, 74,096 tons of spiegeleisen were produced from 149,374 tons of zinc residuum containing 12 per cent manganese; in 1925, 65,673 tons of spiegeleisen were produced from 120,834 tons of zinc residuum containing 13 per cent manganese.

In 1926, 11,219 tons of low-grade residuum containing approximately 7.5 per cent manganese were utilized in the manufacture of pig iron.

Manganiferous residuum, from zinc roasting in the United States, shipped in 1919–1926, in long tons

1919	80, 418	1923	132, 801
1920	133, 602	1924	119, 457
1921	12, 627	1925	147, 937
1922	81, 333	1926	179, 926

MANGANIFEROUS SILVER ORE

Silver ores high in manganese are especially desirable in localities where smelters have to handle largely what are known as "dry ores." As a flux, manganese is slightly more desirable than is iron. Manganiferous silver ore containing only a few ounces of silver is sometimes utilized by smelters solely for its fluxing value based on its manganese content. Other ores that are high in silver and contain a considerable percentage of manganese may be shipped for their silver content and not for the value that they may have as a flux.

Manganiferous silver ore shipped from mines in the United States, 1917–1926, in long tons[1]

Year	Arizona	Colorado		Montana	Nevada	New Mexico	Utah
		For fluxing	For other purposes				
1917	32,409	20,600	104,115		122,872		100
1918	10,854	24,931	99,110		80,096	475	
1919	1,964	29,769	11,055		77,815	250	
1920	345	34,670	11,056		95,142	541	
1921		10,819	924		14,871	300	
1922		13,951		6,656		8,764	
1923		10,376	18,348	3,596	28,571		
1924		4,488	30,949	5,607	16,710		
1925		11,366	7,352		16,168		
1926		6,656	2,925		11,051		

[1] All used for fluxing except that from Colorado designated "For other purposes."

FERRUGINOUS MANGANESE AND MANGANIFEROUS IRON ORES UTILIZED IN THE MANUFACTURE OF MANGANESE PIG

The increased production of ferruginous manganese ore in Nevada during the last few years may be attributed to the broadening of the market. Heretofore the ferruginous manganese ore from the mines of the Pioche district was largely utilized in smelting of gold, silver, copper, and lead ores. The establishment of pig-iron furnaces at Provo, Utah, enabled the producers to ship 12,205 tons in 1926 for the manufacture of low-manganese pig. In 1926 there was an increase in the consumption of ferruginous manganese and manganiferous iron ores and of iron ores containing less than 5 per cent and more than 3 per cent of manganese, which are utilized in making low-manganese pig. The rather rapid growth since 1911 of the utilization of these ores in the blast furnace is responsible for this increase. Shipments of ore containing 5 to 10 per cent manganese amounted to 835,412 tons in 1926, valued at $1,934,381, as compared with 1,153,268 tons in 1925, valued at $2,799,403. The larger utilization of these ores has apparently not decreased the consumption of high-grade manganese ores.[6]

CUYUNA RANGE SHIPMENTS

Manganiferous iron ore (containing 5 to 10 per cent of manganese) shipped from the Cuyuna district, Minnesota, 1918–1926, in long tons

Mine	1918	1919	1920	1921	1922	1923	1924	1925	1926
Cuyuna Mille Lacs (Louise)	25,560						9,737	165,142	[a] 12,046
Evergreen									6,054
Hillcrest	20,242			15,473	4,100				
Kennedy			9,511						
Mahnomen-Sultana-Hopkins[b]	175,648	90,896	81,066	41,057	110,590	282,883	128,967	206,155	384,753
Mangan, Nos. 1 and 2	4,679								
Martin	1,073								
Milford (Ida Mae)					870	77,300		205,050	202,154
Portsmouth			158,336		133,000	138,998			
Sagamore		7,324					222,823	165,062	194,451
	227,202	98,220	248,913	56,530	248,560	499,181	361,527	741,409	799,458

[a] Includes sinter. [b] Mahnomen prior to 1926.

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[6] Joseph, T. L., Barrett, E. P., and Wood, C. E., "Minnesota manganiferous iron ores in relation to the iron and steel industry": Am. Inst. Min. and Met. Eng., No. 1665–C., p. 44.

CHEMICAL ORES

PRODUCTION

The shipments of chemical ore in 1926 were 19,728 tons, valued at $848,770, as compared with 22,151 tons, valued at $902,970, in 1925. The average price of the chemical ore for 1926 was $75 a ton for 82 to 87 per cent MnO_2, according to the Engineering and Mining Journal.

Chemical manganese ore shipped from mines in the United States, 1919–1926, by States

Year	California		Idaho		Montana		Virginia		Total	
	Long tons	Value	Long tons	Value	Long tons	Value	Long tons	Value	Long tons	Value
1919	179	(1)	------	------	19, 896	(1)	--------	--------	20, 075	$797, 163
1920	------	------	------	------	14, 809	(1)	18	(1)	14, 827	539, 543
1921	------	------	------	------	11, 129	$444, 981	102	$3, 000	11, 231	447, 981
1922	------	------	------	------	9, 706	(1)	800	(1)	10, 506	404, 965
1923	------	------	------	------	19, 540	646, 225	900	40, 000	20, 440	686, 225
1924	------	------	------	------	23, 512	816, 463	1, 125	50, 000	24, 637	866, 463
1925	------	------	------	------	20, 529	825, 970	1, 622	77, 000	22, 151	902, 970
1926	------	------	30	(1)	17, 904	(1)	1, 794	(1)	19, 728	848, 770

[1] Bureau of Mines not at liberty to publish figures.

MANGANESE MINING, BY STATES

ALABAMA

Shipments of manganese ore (35 per cent plus manganese) from Alabama in 1926 were 896 tons, a decrease of 42 tons from the shipments in 1925. Shipments of ferruginous manganese ore containing 10 to 35 per cent manganese were 1,018 tons, as compared with 298 tons in 1925. There was no production of manganiferous iron ore in 1926.

ARIZONA

Arizona shipped 2,684 tons of manganese ore in 1926 and 294 tons in 1925. The increase was due to the shipments from the properties controlled by the Calumet & Arizona and the Phelps Dodge companies in the Bisbee area. Shipments of ferruginous manganese ore totaled 46 tons. There was no production of manganiferous iron ore.

ARKANSAS

In 1926 Arkansas shipped 2,450 tons of ore carrying 48 per cent or more of manganese, as compared with 3,517 tons in 1925, 3,400 tons in 1924, and 3,768 tons in 1923. During this period the price has been relatively constant. The Arkansas shipments of ferruginous manganese ore for 1926 were 8,195 tons, as compared with 5,076 tons in 1925. The gradual increase in production of this class of ore is in part due to the demand of the southern furnace companies for ores from the Batesville-Cushman district that have a manganese content of approximately 20 per cent. These ores are utilized in the manufacture of low-manganese pig, and, because of their composition, are a satisfactory partial flux for use with the southern iron ores. There was no production of manganiferous iron ore in Arkansas during 1926.

Late in December, 1925, the Arkala Manganese Ore Co. acquired the Roach Hill and Eureka mines, near the Polk Bayou in the Cushman district. The Roach Hill mine has been described by Miser,[7] who says:

> The manganese ore occurs in irregular masses, some as much as several feet across, and in small pieces, many of which have a botryoidal shape. * * * The masses of manganese ore at this mine are not residual from the Cason shale and Fernvale limestone, as is most of the ore of the Batesville district, but manganese in solution has been introduced into the clay by ground water, from which the present manganese oxides were deposited, partly or entirely replacing the clay.

The concentrates from this mine fall under the classification of ferruginous manganese ores. The Eureka mine includes the old Montgomery mine and also what was known as the Baxter Cut. These properties were described by R. A. F. Penrose in the Annual Report of the Arkansas Geological Survey, volume 1, 1890, pages 246–247. His analysis of what he terms "A soft earthy but compact ore of a jet black color" is as follows: Manganese, 14.57 per cent; iron, 10.84 per cent; silica, 37.77 per cent; alumina, 9.87 per cent; and water, 12.82 per cent.

The properties are connected with the Missouri Pacific Railroad at Cushman by a 7-mile narrow-gauge industrial railway.

During the latter half of 1926 some properties at Blowing Cave, Polk Bayou, and Sullivan Creek, Independence County, were taken over by L. B. Miller and W. G. Rinehart. Blowing Cave is 3½ miles northwest of Batesville. A concentrating plant has been erected for beneficiating low-grade ore. The product of the mill contains approximately 22 per cent manganese and 19 per cent iron.

CALIFORNIA

In 1926 the shipments of manganese ore carrying 45 per cent or more of manganese amounted to 393 tons as compared with 869 tons shipped in 1925. There was no production of ferruginous manganese or manganiferous iron ores during the year.

COLORADO

In 1926 Colorado produced no manganese ore and made no shipments of it. In 1925, however, 743 tons of manganese ore were shipped; in 1924, 5,338 tons; in 1923, 2,278 tons. The Leadville area, from which most of the ore has been shipped in the past, contains relatively large resources of manganese ore of metallurgical grade as compared with the known resources of other States. The shipments of ferruginous manganese ore, exclusive of fluxing ore, amounted to 2,925 tons in 1926, as compared with 7,352 tons in 1925. No manganiferous iron ore was shipped in 1926, although there are large bodies of this type of ore near Red Cliff.

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[7] Miser, H. D., "Deposits of manganese ore in the Batesville district, Arkansas": U. S. Geol. Survey Bull. 734, 1922, pp. 169–170.

GEORGIA

Shipments of high-grade ore containing 35 per cent or more manganese, amounted to 3,251 tons in 1926. In 1925 the production of this class of ore was 1,649 tons. In 1926 Georgia ranked third as a producer of manganese ore, and in 1924 and 1925 it had a larger number of shippers than any other State. In 1926 Montana held this position. The production of ferruginous manganese ore in Georgia in 1926 was by 17 shippers who contributed 18,414 tons, as compared with 20 shippers in 1925 and 28,038 tons shipped. The shipments of manganiferous iron ore in 1926 amounted to 6,547 tons. The production of this State may be maintained largely by the seasonal activities of the occupants of the various farms on which manganese is found.

IDAHO

D. F. Hewett, of the United States Geological Survey, reports that the Idaho Manganese Co. has been exploiting since April, 1924, a manganese deposit on the McGregor ranch, 1 mile east of Cleveland, Bannock County, Idaho. The shipments in 1926 were 830 tons and during 1927 will probably be larger. The ore consists of nodules of the several manganese oxides embedded in brown wad and forms a distinct bed in Pleistocene (Ice Age) sediments. In the explored area the bed will probably yield 3,000 tons per acre; the extent of the bed is assuredly several acres and may be more. Most of the shipments range from 42 to 48 per cent manganese. The ore is shipped by auto truck to Grace, 14 miles north, thence by rail to the Columbia Steel Co., Ironton, Utah.

MICHIGAN

No high-grade manganese ore is shipped from Michigan. In 1926 the production of ferruginous manganese ore, carrying an average of 13.49 per cent of manganese, was 107,202 tons, in contrast with 98,753 tons, carrying an average of 10.89 per cent manganese, in the preceding year. In 1926 a total of 398,236 tons of ore was shipped that contained 3.42 per cent manganese, natural, or 3.67 per cent manganese, dry; this ore is kept separate from the general shipments of iron ores and is utilized in the manufacture of pig iron.

MINNESOTA

High-grade manganese ore is not found in Minnesota. In 1926 the shipments of ferruginous manganese ore were 158,759 tons as compared with the 77,665 tons in 1925. The shipments of manganiferous iron ore were 799,458 tons in 1926 and 741,409 tons in the preceding year. The average manganese content of the shipments in 1926 was 7.35 per cent. Increasing use for the manufacture of low-manganese pig iron of ores like those produced by this State will no doubt materially increase shipments in 1927.

MONTANA

The Butte area of Montana shipped 1,263 tons of metallurgical ore in 1926, as compared with 47,507 tons in 1925. This great decrease was due to the small production of rhodochrosite. The long railway haul to points of consumption and the correspondingly high freight charges have constituted the principal hindrance to production. One producer has been engaged in experimental work on the sintering or nodulizing of the ores, thus eliminating a part of the carbon dioxide in the rhodochrosite ($MnCO_3$) and raising the grade from approximately 37 per cent Mn to 52 to 55 per cent Mn.

The Philipsburg district in 1926 shipped 4,450 tons of metallurgical ore and 17,904 tons of chemical ore. In 1925 the district produced 20,529 tons of chemical ore.

As can be seen from the table on page 143, by far the larger part of the United States production was of high-grade manganese ores from the Philipsburg district. During 1926 there was considerable activity in this area, with the result that the known reserves are larger.

An approximate analysis of the concentrates shipped from the district is as follows: Manganese dioxide (MnO_2), 70.09 to 72.34 per cent; manganese (Mn), 47.41 to 49 per cent; silica (SiO_2), 9.67 to 13 per cent; iron (Fe), 1.25 to 2 per cent; copper (Cu), 0.005 to 0.023 per cent; arsenic, 0.016 to 0.021 per cent; lead, 0.059 to 0.150 per cent; available oxygen, 10 to 11 per cent; moisture, varying from 3 to 3.3 per cent.

Montana did not ship any ferruginous manganese or manganiferous iron ore in 1926.

NEVADA

Nevada shipped 1,607 tons of high-grade manganese ore in 1926, as compared with 850 tons in 1925. Shipments of ferruginous manganese ore from Pioche and Ely in 1926 were 12,205 tons and in the previous year 6,659 tons. The gain in shipments may be largely attributed to the demand for manganese having been increased by the Columbia Steel & Iron Co.'s plant at Provo. Shipments of manganiferous silver ore for fluxing purposes amounted to 11,051 tons in 1926, as compared with 16,168 tons in 1925. No manganiferous iron ore was produced.

NEW MEXICO

In 1926 the shipments of manganese ore containing 45 per cent of manganese were 1,966 tons, as compared with 1,588 tons, averaging 46 per cent, in 1925. Shipments of ferruginous manganese ore in 1926 were 52,033 tons containing 12 per cent of manganese; in 1925 shipments were 40,848 tons containing 13 per cent manganese. No manganiferous iron ore was produced in 1924 and 1925, but 29,407 tons were shipped in 1926. The increased shipments of manganese ore may be attributed to the Manganese Valley mine, on the east flank of the Little Florida Mountain, about 13 miles east of Deming, N. Mex. The property has been under lease since 1923; the mine is developed by adits, and the ore is stoped. The crude ore is dressed by hand sorting, screening, and jigging, and the product is shipped to Birmingham, Ala., and to Pacific coast points. The shipping point is Miesse, on the Southern Pacific Railroad, about 8 miles from the mine. Some shipments of ore are said to average 70 per cent manganese dioxide.

NORTH CAROLINA

During 1926 there was one shipper of manganese in North Carolina. The shipments consisted of 55 tons of manganese ore carrying 39 per cent manganese.

TENNESSEE

Shipments of manganese ore containing 40 per cent of manganese amounted to 1,555 tons in 1926, as compared to 352 tons of high-grade ore in the previous year. The shipments of ferruginous manganese ore in 1926 were 953 tons. No shipments of manganiferous iron ore were reported during the year.

VIRGINIA

Shipments of manganese ore amounted to 3,792 tons in 1926; the ore averaged 44.59 per cent manganese. Of these shipments, 1,998 tons were metallurgical ore and 1,794 tons chemical ore. In 1925 the shipments of both classes of ore amounted to 3,121 tons. Shipments of ferruginous manganese ore were 2,135 tons in 1926, as compared with 1,800 tons in the previous year. No shipments of manganiferous iron ore were made in either year. The production of chemical ore in Virginia has been by the Hy-Grade Manganese Co., operating properties on or near the Mineral Ridge in Cedar Creek Valley, 11 miles north of Woodstock and 10½ miles west-northwest of Strasburg. At one time the Mineral Ridge mine was known as Paddy's Run mine, which is said to have made a shipment to England in 1834. The mine had been worked sporadically and on a comparatively small scale by various operators until April 1, 1920, when it came under the management of the Hy-Grade Manganese Co. The total production of the mine before April, 1921, was about 4,000 tons of ore.[8] Since then annual shipments have been made of ore mined in the course of development work and prospecting, and upward of $252,000 has been realized. It is said that more than 3,000 feet of development work has been done, 300,000 tons of ore blocked out, and 700,000 tons of probable ore indicated. The ore is concentrated, and 80 per cent [9] of the manganese is recovered.

An average analysis of samples of the first-grade ore removed in January, February, and March, 1920, from the lowest tunnel is approximately as follows: Manganese dioxide, 80 per cent; manganese, 52 per cent; iron, 1.4 per cent; baryta, 8 per cent; silica, 4 per cent; phosphorus, not reported. Early shipments from this locality show a phosphorus content of 0.144 to 0.42 per cent.

WASHINGTON

In 1926 shipments of high-grade manganese ore were 3,162 tons containing over 50 per cent manganese, giving Washington the fourth place as a producer. This ore came from the Crescent mine, on the Olympic Peninsula, Clallam County, the largest single producer of high-grade metallurgical manganese ore in the United States during 1926. In July, 1926, the developed ore was exhausted. A fault was encountered on the 400-foot level, and the operators (lessees) were unable to find a continuation of the ore bodies. The total production up to July, 1926, was 16,275 tons of ore averaging more than 51 per cent manganese.

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[8] Stose, G. W., and Miser, H. D., "Manganese deposits of western Virginia": Virginia Geol. Surv. Bull. 23, 1922, p. 59.

[9] Estimated reserves; verbal statement by J. C. Adkerson, manager of the property.

WISCONSIN

In 1926 the only class of manganiferous ore shipped from Wisconsin was an iron ore containing 4.99 per cent manganese, natural, or 5.54 per cent manganese, dry. Shipments were 247,261 tons. In 1925 the shipments were 404,014 tons containing 5.27 per cent manganese, natural.

FOREIGN RESOURCES

GENERAL STATEMENT

The world's production of manganese in 1925 was approximately 2,750,000 long tons, of which India produced 31 per cent; Russia, 29 per cent; Gold Coast, 13 per cent; Brazil, 12 per cent; Cuba, 0.9 per cent; Netherland East Indies, 0.4 per cent; and Chile, 0.4 per cent. In 1924 the world's production was approximately 2,160,000 long tons. India produced 37 per cent; Russia, 23 per cent; the Gold Coast, 12 per cent; and Brazil, 7 per cent. Russia's gain in 1925 was due to the large output of the Nikopol deposits in Ukraine.

RUSSIA

UKRAINE

Nikopol.—Prior to the World War the manganese produced from the Nikopol deposits was largely used by the Russian steel industry. At times relatively small amounts were shipped by rail to Germany. In January, 1925, the Union of the Soviet Socialist Republics of Russia granted a concession on the Nikopol deposits to the Handelsvertretung der Union der Sozialistischen Sowjet-Republiken of Germany. The company is known as the Southern Russian Ore Trust (Yushnorudnii Trust Charkow). This concession embraces not only the manganese of the Nikopol but also the Krivoi-Rog iron mines. Under the contract the concessionaires agreed to erect dressing plants and to equip the property thoroughly. On June 12, 1925, a similar concession for the exploitation of part of the Tchiaturi deposits of Georgia had been granted by the Soviet Government to American interests.

In 1926 the Nikopol concession was renewed, the firm of William Muller & Co., of The Hague, participating in the agreement to the extent of 50 per cent, and the concessionaires granted Rawack & Grünfeld the exclusive sale right for the distribution of the manganese ores in Central Europe.

For many years the firm of William Muller & Co. has been interested in one of the largest producing companies in the Tchiaturi field.

The agreement of Rawack & Grünfeld with the Southern Russian Ore Trust was modified late in December, 1926, and put on a brokerage basis. The trust is to deliver to Rawack & Grünfeld 819,000 tons of ore, for which it will receive an advance of 3,000,000 rubles from the German firm.

During the fiscal year ended September 30, 1926, 419,000 tons of ore (high grade and washed ore) were produced,[10] as compared with 180,000 tons during the previous year. The exports of the Southern Russian Ore Trust through the German firm of Rawack & Grünfeld in the fiscal year 1925–26 amounted to 235,000 tons, as compared with 137,000 tons for 1924–25.

Ores from the Tchiaturi deposit, because of transportation facilities by water (Rhine River, etc.), can be laid down in Germany slightly cheaper than those from Nikopol. To meet this competition in part, ores of the Nikopol region have been sold at a figure per unit slightly less than those of Tchiaturi. In December, 1926, Nikopol ore was quoted in Germany at 4d. per unit less than the current price (1s. 10d.) of similar ores.

In 1926 manufacture of steel in Russia was virtually on a par with manufacture in 1913. The annual consumption of manganese in Russia before the war was about 200,000 tons, largely supplied by the Nikopol deposits. Consequently the Russian demand in 1926 was more than satisfied by the Nikopol output. A surplus of 215,930 long tons was exported during the calendar year, as follows:

Manganese ore exported from the Nikopol deposits, Russia, in 1926

Destination:	Long tons
Belgium–Luxemburg	32,044
France	97,382
Germany	38,048
Italy	10,132
Poland	38,324
	215,930

The Nikopol ores are higher in silica than the Tchiaturi ores.

GEORGIA

Tchiaturi.—From time to time during the year it has been reported that the concessionaires of the Tchiaturi deposit have been negotiating with the Soviet Government for a modification of their contract of June 12, 1925. Up to April 1, 1927, no official public announcement as to any modification of the contract had been made by either the Soviet Government or the concessionaires.

From July 25, 1925, to the end of 1926 the shipments of the concessionaires have been 548,331 tons. The average number of workers employed from August, 1925, to August, 1926, has been given as 2,900 with a staff numbering 467.[11] Production of crude ore during that period is reported to be 762,000 metric tons and exports 465,393 metric tons.

The shipments, in long tons, from Tchiaturi during the calendar year of 1926 and the countries of destination were as follows:

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[10] Commerce Reports, Apr. 4, 1927, p. 36.
[11] Mining Journal (London), Apr. 2, 1927, p. 287.

Manganese ore exported from Tchiaturi, Russia, in 1926, in long tons

Destination	Metallurgical ore	Chemical ore	Total
England	24,318	314	24,632
France and Belgium	59,494	2,227	61,721
Germany	106,660	8,910	115,570
Italy	12,185	39	12,224
United States	181,335	1,055	182,390
	383,992	12,545	396,537

INDIA

There was a large increase in the production of high-grade ore in India during 1926, but shipments were decidedly less than in 1925. This condition was due in part to the curtailment in the manufacture of steel in England and the closing down of the ferromanganese furnaces, which may be directly attributed to the curtailed production of coal through the prolonged coal strike in England during the year 1926.

In November, 1926, the United Kingdom Ferromanganese Co. was registered with a capital of £750,000 sterling. The Central Provinces Co. of India has subscribed to half of this capital and some of the largest manufacturers of ferromanganese in Great Britain have subscribed to the rest. The new company is to act as the marketing agency of the ferromanganese produced. Of all the mines in the world, those of the Central Provinces Manganese Ore Co. (Ltd.) were among the most successful financially. In 1908 a company known as the Central Provinces Prospecting Syndicate was formed, which took over some 20 manganese mines in the Central Provinces, India. Its capital is £300,000. In 1908 it paid 16 per cent and since then has never paid less, in spite of bonuses of stock from time to time. In 1926, up to October 4, a 10 per cent dividend, free from tax, was declared.

The Central Provinces of India contributed 90 per cent of the total Indian exports of manganese for the year ended December 31, 1925. At the pit mouth the average value of the ore per ton was Rs 25–3–10. During the year the railway connecting the mines with the port and the port facilities were both greatly improved; in addition, the freight rate on manganese ore from India to England was reduced from 25s. to 20s. per ton.

In the past in India the annual production has been relatively constant; shipments have varied, and thus at times considerable stocks have accumulated. In 1925 the production was 839,461 long tons; the exports were 738,851 tons, including a small tonnage from Gôa, Portuguese India. The receipts of manganese ore at the iron and steel works of India during 1925 were 38,242 tons, thus indicating an apparent addition of 62,368 tons to stocks at the mines at the end of 1924. The production in 1926 was 1,014,928 tons. The exports from British Indian ports were 523,916 tons, exports from Portuguese India were 89,620 tons, and domestic consumption was about 40,000 tons, thus showing an apparent addition to stocks at the mines of 361,392 tons, or an apparent accumulation of 423,760 tons for the two years.

Developments in the manganese industry of the world during the past few years seem to indicate that an overproduction may result which will force any accumulated stocks on the market at a figure materially lower than the prices current during 1926. Shipments of manganese ore from British Indian ports in 1926 were 80,282 tons less than in 1925.

The amount and destination of exports from Indian ports, excluding British Indian ore (89,620 long tons) shipped from the Port of Mormugao, Portuguese India, were as follows:[12]

Manganese ore exported from British Indian ports in 1926

Destination:	Long tons
Belgium	185, 974
France	151, 906
Germany	6, 346
Italy	9, 600
Netherlands	14, 800
United Kingdom	74, 750
United States	67, 250
Other countries	13, 290
	523, 916

The Indian Government tax on manganese ore is applied as follows: The workings in British India are subject to a royalty of 2½ per cent on the sale value at the pit's mouth, but, as this is inconvenient to assess, the rate has been fixed (except for the relatively small production in Madras) at half an anna[13] per ton of ore when the price per unit of first grade ore is 8d. and half an anna for each additional penny in the unit price up to 11d. When the price per unit is 12d. the royalty is 3 annas per ton of ore, an addition of 1 anna being made for each additional penny in the unit price up to 14d., the scale thereafter up to 18d. being increased by a further 2 annas for every extra penny in the unit price. The royalties in Indian States are as a rule considerably higher.

In the Mining Journal, London, April 2, 1927, page 287, the following appears:

> The Government of the Central Provinces has recently written to all manganese-mining concessionaries, proposing to increase the existing royalty rates on manganese ore and asking if they have any reasons to urge against the proposal.

A factor in the production of manganese in India is the increased consumption of high-grade manganese ore by the domestic steel industry. The three principal Indian iron and steel companies not only use manganese in the steel furnaces for the manufacture of certain grades of steel, but also in the manufacture of ferromanganese and for additions to the blast-furnace charge in the manufacture of pig iron. In 1925, 38,242 tons were shipped to the iron and steel works, an increase of nearly 11,000 tons over 1924. The consumption in the industry (34,843[14] tons), however, was slightly less than in the previous year.

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[12] Seaborne Trade and Navigation of British India for 1926.

[13] The approximate value of the rupee is 31 cents; there are 16 annas to the rupee.

GOLD COAST

INSUTA-DAGWIN CONCESSIONS

The improvements in handling the ore, which were inaugurated in the last two years by the African Manganese Mining Co. (Ltd.), operator of the Dagwin manganese concessions, have greatly facilitated exports in 1925 and 1926. The exports of 1926 were 344,933 tons.[15]

During the fiscal year April, 1925, to March, 1926, 361,838 wet tons were shipped, valued at £684,384, an increase of 84,933 tons over the previous fiscal year. The property has been equipped with four Ruston & Hornby steam shovels, and a washing plant with a capacity of 1,800 tons a day has been completed which contains crushers, trommels, two large log washers, jigs, and other equipment. An endless-rope haulage way has been installed, and upward of 12 miles of 30-inch gauge have been laid with 35-pound rails. Labor is plentiful.[16]

A. E. Kitson, director of the Geological Survey, Gold Coast. Africa, in a paper entitled "Geology of manganese ore deposits of the Gold Coast, Africa," read before the Cleveland meeting of the American Institute of Mining and Metallurgical Engineers, April, 1927, after describing the various occurrences of manganese in the Gold Coast, said

> From the foregoing remarks it is apparent that the only deposit of manganese ore of economic importance that is known in the Gold Coast is that of Insuta-Dagwin. It is in a district with one of the highest annual rainfalls on the coast and in the thick forest region. How far these conditions are necessary for the concentration of the ore is not yet known, but there seems to be no doubt that excessive humidity and protection from loss of soil are two essentials.
>
> Analyses of average ore from some of the foregoing occurrences are as follows:

Analyses of some Gold Coast manganese ores

	Manganese, per cent	Iron, per cent	Phosphorus, per cent
Dagwin-Insuta	50–53	2–4	0. 1–0. 12
Odumase-Konongo	22. 22	4. 37	Trace.
Kalimbi Hill	15–22	5–10	Trace.
Siro-Wa	30. 1	7. 7	------------
Zuaragu	9–12	2–4	Trace.

Norway and Canada, because of cheap hydroelectric power for the manufacture of ferromanganese, are large importers of the Gold Coast ores. The major part of the ferromanganese made in both countries is shipped to the United States.

During the year considerable development work was done in the Dagwin mines, and the reserves of ore in sight are said to have been materially increased.

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[14] Records of Geological Survey of India, vol. 59, pt. 3, 1926, p. 272.

[15] Mining Magazine (London), April, 1927, p. 199.

[16] Report Mines Department, Government of the Gold Coast, for the period April, 1925–March, 1926, pp. 21–22.

The following table shows the exports of Gold Coast manganese ore during the years 1924, 1925, and 1926:

Manganese ore exported from the Gold Coast, 1924–1926, in long tons [1]

Destination	1924	1925	1926
Belgium	6,014		(2)
Canada	6,568	50,924	
France	28,859	42,134	
Germany		6,695	
Netherlands		1,915	
Norway	79,538	142,973	
United Kingdom	44,782	18,646	
United States	67,641	75,370	
	233,402	338,657	344,933

[1] These figures represent dry weight of ore exported, as contrasted with the figures of natural weight shown in the world table on page 177.
[2] Figures by countries not available.

BRAZIL

The high export duty imposed by the Brazilian Government did not during the calendar year curtail exports, which were larger than in any year since the war, except 1920 and 1922.

In the first three months of 1926 the exports amounted to 93,700 tons of ore. A decided curtailment during the first quarter of 1927 is evidenced by the table following:

Stocks, production, and exports of manganese ore in Brazil, January to March, 1927, in long tons [1]

Month	Stocks first of month	Production	Exports
January	[2] 27,880	18,203	21,783
February	24,300	16,757	6,000
March	35,057	18,594	9,889

[1] Commerce Reports, May 2, 1927, p. 292.
[2] Previously reported as 25,905; revised figure presumably final.

Of the February exports, 4,000 tons went to Belgium and 2,000 tons to the United States. In March 2,000 tons were exported to Belgium and 7,889 tons to the United States. This decrease in the first quarter of 1927 would seem to indicate decidedly smaller shipments in the near future.

The United States is the principal consumer of Brazilian ore, and the larger part of the ore is produced by a subsidiary of an American steel company.

On April 1, 1926, shipments of manganese ore from Brazil virtually ceased because a change in the regulations governing export duty increased the official valuation of third-class manganese ore from 80 to 90 milreis[17] per ton and raised the value of second-class ore from 100 to 120 milreis per ton. Although the rate of duty remained fixed at 12 per cent, the increase in official valuation materially increased the tax per ton. On April 14, 1926, as a result of the protest of the manganese exporters, the Government lowered the official valuation for second-class ore from 120 to 100 milreis, while third-class ore remained at 90 milreis. Thereafter shipments were resumed. On April 14, 1926, the official valuation for first-class ore was fixed at 120 milreis per ton. Very little ore is exported under the first-class specifications. The larger part of the exports is second and third class ore.

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[17] A gold milreis equals $0.546 United States mint value.

The accompanying table indicates the changes in the status of the official valuation of the three classes of ore:[18]

Valuation of manganese ore exported from Brazil

Class	Per cent Mn	Value per ton in milreis		
		Prior to Apr. 1, 1926	Apr. 1 to 14, 1926	Apr. 14, 1926, and present
First	49. 1–52	130	----------	120
Second	46. 1–49	100	120	100
Third	44. 1–46	80	90	90

During the year the Compagnie Belgo-Brésilienne Industrielle et Commerciale, with headquarters at Liège,[19] was formed in Belgium to mine manganese in the Castankeyra-Nazareth district of the State of Minas Geraes in Brazil.

The following table summarizes the disposition of Brazilian manganese ore during the years 1925 and 1926:

Production, exports, and stocks of manganese ore in Brazil, 1925 and 1926, in long tons [a]

	1925	1926
Production:		
Minas Geraes	326, 585	250, 132
Bahia	([b])	[c] 5, 902
Exports:		
From State of Minas Geraes, through Rio de Janeiro—		
United States	240, 537	281, 204
Holland	34, 383	9, 325
France	11, 200	7, 066
Belgium	10, 185	7, 756
Great Britain	6, 000	------------
Total from Minas Geraes	302, 305	305, 351
From State of Bahia through Port of Bahia—		
United States	([b])	4, 292
Belgium and France [d]	([b])	1, 610
Total exports	302, 305	311, 253
Stocks at end of year [e]	81, 124	[f] 25, 905

[a] Commerce Reports, Apr. 4, 1927, p. 37.
[b] No record of production or exports in this or other States in 1925.
[c] Reported as exported from Bahia; later figures give exports as 6,288 long tons.
[d] Separate figures not available.
[e] For State of Minas Geraes only; no record of stocks elsewhere.
[f] Later revised to 27,880 tons (see p. 166).

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[18] Foreign tariff division, Bureau of Foreign and Domestic Commerce.
[19] Brass World and Platers' Guide, September, 1926, vol. 22, No. 9, p. 304.

Production, exports, and stocks of manganese ore in Minas Geraes, Brazil, in 1926, in long tons [1]

Month	Stocks first of month	Produced and shipped from mines	Total ore available	Exports through Rio de Janeiro	Stocks end of month
January	81, 124	33, 665	114, 789	26, 500	88, 289
February	88, 289	24, 035	112, 324	40, 700	71, 624
March	71, 624	26, 900	98, 524	26, 500	72, 024
April	72, 024	21, 201	93, 225	12, 500	80, 725
May	80, 725	24, 832	105, 557	23, 700	81, 857
June	81, 857	23, 713	105, 570	40, 105	65, 465
July	65, 465	31, 556	97, 021	31, 400	65, 621
August	65, 621	21, 596	87, 217	24, 460	62, 757
September	62, 757	15, 021	77, 778	17, 445	60, 333
October	60, 333	10, 078	70, 411	29, 581	40, 830
November	40, 830	5, 138	45, 968	21, 356	24, 612
December	24, 612	12, 397	37, 009	11, 104	[2] 25, 905
	------------	250, 132	------------	305, 351	------------

[1] Compiled by Bureau of Foreign and Domestic Commerce.
[2] Later revised to 27,880 tons.

Adding the stocks at the beginning of the year to the ore produced and shipped by the mines shows that 331,256 tons of ore were made available in 1926. If the exports of 305,351 tons are deducted the stocks at the end of the year are found to be 25,905 tons.

A production of 256,420 tons of manganese ore during 1926, as compared with 326,585 tons in 1925, indicates a curtailment of mining. However, the shipments of 1926 were greater than those of 1925, and the stocks on hand January 1, 1927, were much smaller than those on hand at the beginning of 1926.

NETHERLAND EAST INDIES

In 1918 the concessions of Kliripan & Penggoeng, near the town of Djokdjakarta, Java, were purchased by the Algemeene Industrieele Mijnbouw en Exploitatie Mij., of Bandoeng. In 1922 the shipments were 2,511 long tons; in 1923, 3,920 tons; in 1924, 9,808 tons; in 1925, 9,870 tons; and in 1926, 11,047 tons.

During the years 1925 and 1926 the exports and destinations were as follows: [20]

Manganese ore exported from Netherlands East Indies, 1925–26, by destinations, in long tons

Destination	1925	1926	Destination	1925	1926
Belgium	717	---------	Netherlands	2, 978	2, 872
Denmark	216	466	Norway	52	--------
France	3, 260	423	United States	1	1, 050
Germany	916	2, 612	Other countries	1	223
Great Britain	1, 403	1, 697			
Italy	326	1, 704		9, 870	11, 047

The production in 1924 was 8,348 tons, and 10,792 tons were sold in 1925. In 1926 the shipments were handled largely by Erts en Chemicalien Mij., Rotterdam. In 1918 the reserves were estimated by O. G. Heldring to be probably about 10,000,000 tons.[21] Development of the manganese deposits since 1918 has been gradual. The larger part of the shipments is chemical ore, with an approximate analysis[22] as follows: Manganese dioxide (MnO_2), 89.59 per cent; manganese oxide (MnO), 1.99 per cent; silica (SiO_2), 1.32 per cent; iron (Fe), 0.37 per cent; lead (Pb), 0.006 per cent; zinc (Zn), none; copper (Cu), 0.0015 per cent; and phosphorus (P), 0.18 per cent. This ore contains 58.15 per cent metallic manganese and 16.49 per cent available oxygen.

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[20] Hoover, C. L., Manganese Ore in the Netherlands Indies: Cons. Rept. 244,700, Batavia, Java, Mar. 28, 1927.

In Holland and also in Italy are mills that prepare the Java manganese ores for the market.

CHILE

As a result of the high price of manganese ore during 1924, 1925, and part of 1926, manganese ore from Chile has entered the market. The deposits, which are fairly large, have been examined by Harder.[23] Inaccessibility and high cost of transportation restrict production in Chile to periods of high prices.

PORTUGUESE INDIA

In 1906 manganese was discovered near Mormagão, Gôa. Since then some 20 mines have been located.[24] The mine on which most development work has been done is the Thummaraguddi (the property includes 1,580 acres) in the district of Bellary. The lessors' agents are the Banco Nacional Ultramarino, Bombay, India. During October, 1924, the average production was 80 tons a day. The company employed some 600 men and women. As the property is some distance from the railroad, the ore has to be hauled by truck to Kanivilhalli, whence it is shipped by rail to the port of Mormugão, where it is loaded on ships at the quays. The grade of the ore ranges from 42 to 46 per cent manganese. Complete data on production and exports are not available. Belgium received 4,486 long tons in 1926 and 10,197 long tons in 1925 from Portuguese India.

CUBA

In Cuba the reserves of high-grade metallurgical and chemical ore have been estimated to be about 700,000 tons.[25] During the year 1926, 10,000 long tons of metallurgical ore were produced in Cuba, and 8,100 tons were shipped to the United States. The year's surplus, added to accumulated stocks, makes approximately 10,000 tons on hand. In 1925 the entire output, 23,000 tons, was shipped. In 1926, besides the ore mentioned, chemical ore containing 1,006 tons of metallic manganese was exported from Santiago, Cuba. The shipments of metallurgical ore were made during the early part of the year, under a contract that expired in June. The Cuban producers were unable to renew their contract at satisfactory prices, and after

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[21] Jewell, J. F., Java Manganese Ore: Cons. Rept. 107,729, Batavia, Java, Sept. 13, 1918.

[22] Ledoux & Co. (Inc.), New York, July 22, 1926.

[23] Harder, E. C., "Manganese ores of Russia, India, Brazil, and Chile": Trans. Am. Inst. Min. and Met. Eng., vol. 56, 1916, pp. 31–68.

[24] Statesman's Year Book, London, 1926.

[25] Mining and Metallurgical Society of America, International Control of Minerals, 1925, pp. 81–82.

June no ore was shipped except the chemical ore mentioned. Cuban ores enter the United States free of duty. The average manganese content of those imported in 1926 was approximately 47 per cent. As ores that carry more than 30 per cent manganese, imported from other countries, pay a duty of 1 cent per pound of metallic manganese, the Cuban producer receives what might be termed a bonus of $10.53. In spite of this advantage he was unable to meet the competition of foreign ores.

UNION OF SOUTH AFRICA

The chapter on manganese in Mineral Resources for 1925 contained a reference to the manganese deposits in the Postmasburg district. These deposits are controlled by the Union Mining & Manganese Corporation and in November were leased to the Afro-American Manganese Corporation (Inc.), formed under the State laws of Delaware. The deposits which were discovered by Dr. A. L. Hall, assistant director, Geological Survey, Union of South Africa, lie approximately 450 miles northwest of the port of East London and the port of Elizabeth. They are said to be extensive. The property being developed is 65 miles from the railhead. Doctor Hall[26] gives the reserves as follows:

	Long tons
(*a*) In outliers and cappings—"in sight"	900,000
(*b*) Along the solid outcrop on the west for 10 feet and also "in sight"	1,800,000
(*c*) Potential but highly probable reserves westward underground, for 100 feet on the dip	18,000,000
Total	20,700,000

Doctor Hall summarizes the occurrence as follows:

1. In the northern part of the Cape Province and extending northward from Postmasburg (roughly 100 miles west of Kimberley) lies a deposit of manganese ore, traceable for 40 miles along the Gamagara Ridge and belonging to the lowermost beds of the Matsap system, which rests on the limestones of the Campbell Rand series.
2. The bulk of the ore is psilomelane and forms a sheet up to some 20 feet thick interbedded in slates and ferruginous conglomerates, dipping to the west at low angles.
3. The deposit indicates a ferro-grade ore; it contains from 42 to 58 per cent of metallic manganese, no phosphorus, from 1.75 to 7.0 per cent of silica, and from 3.25 to 10.9 per cent of iron.
4. The mode of occurrence admits of practically opencast mining, and, owing to extensive and sculptured dip slopes, much ore is ready exposed on the surface.
5. The ore is in a very superior physical condition for export and metallurgical treatment.
6. Based on an average thickness of 4 feet, there are approximately 900,000 long tons in sight in the form of residual cappings due to the removal by denudation of the overlying sediments.
7. Along the outcrop of the reef, where it passes westward under the Matsap beds, a further 1,800,000 long tons are in sight, based on an average thickness of 8 feet and on an exploitation over 10 feet on the dip.
8. Further development down to a depth of 100 feet on the dip would yield an additional approximate supply of 18,000,000 long tons on the same basis of average thickness.

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[26] Hall, A. L., "The manganese deposits near Postmasburg, west of Kimberley": Trans. Geol. Soc. of South Africa, vol. 29, 1926, p. 37.

9. Owing to minor folding, the ore body occurs in several outliers and is locally duplicated or triplicated; the extra supplies thus afforded are additional to the above.

10. The nearest railhead is Douglas, distant 65 miles from Postmasburg.

11. In view of the great volume of the manganese industry, the exploitation policy for the Postmasburg deposits should aim at an eventual development on a scale comparable to such an industry.

12. The present distance from railhead is a drawback, but the general prospects are encouraging and deserve to be seriously considered in connection with the Government's railway policy.

CAPE COLONY

Interest is being taken in the manganese properties in the Cape. A new lease of the Houts Bay deposit has been granted, and the lessee claims to have made fresh discoveries. Unfortunately, the ore mined thus far is low grade, and even after thorough sorting it can not be concentrated to a high percentage of manganese. Moreover, the percentage of silica and phosphorus is too high for the manufacture of ferromanganese.

The United States and England are the only countries where ore of this character could be used. In England a market may be found in the production of basic phosphoric iron.[27]

SINAI PENINSULA

The mines of the Sinai Peninsula are operated by the Sinai Mining Co. (Ltd.), of London. The principal mines are the Gebel Ooum Bogna and Gebel Ooum Ronna, situated some 13 miles from the coast and connected with the port of Abou Zenima by a railway and aerial ropeway. Only one class of manganese ore is produced, namely, ferruginous manganese ore, containing approximately 32 per cent Mn and 25 per cent iron.

The shipments of ferruginous manganese ore from the Sinai Peninsula, 1918 to 1926, have been as follows:[28]

	Long tons		Long tons
1918	9, 287	1923	128, 164
1919	42, 723	1924	105, 740
1920	68, 033	1925	82, 509
1921	64, 098	1926	83, 209
1922	95, 275		

An estimate of the ore reserves, made by several engineers, gives the assured ore as 2,513,000 long tons, probable ore 3,070,000 tons, and possible ore 6,274,000 tons. In the director's report of December 31, 1923, the following statement appears:

> As mining proceeds it is evident that our ore deposits are of more irregular formation than anticipated. It is now certain that the area which has hitherto been the main source of our output will not yield the tonnage originally estimated.

AUSTRALIA

In 1926 the West Australian Manganese Co. (Ltd.) was organized, with a capital of £250,000, to take over the manganese deposits at

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[27] Union of South Africa, Dept. Mines, Ann. Repts. of the Secretary for Mines and Industries and the Government Mining Engineer, 1924, p. 161, Pretoria, 1925.

[28] Mineral section, Bureau of Foreign and Domestic Commerce.

Horseshoe, some 86 miles from the railhead at Meekatharra, in the northwestern division of Western Australia. The deposit is some 350 miles from tidewater; the shipping point would probably be Geraldton, in the southwestern division of Western Australia.

The Broken Hill Proprietary Co. holds an interest in the enterprise[29] and has contracted for a supply of rails. The tenor of the ore is said to be 50 per cent.

FRANCE

The domestic production of France is negligible. The imports in 1926 were 601,003 long tons, in comparison with 462,147 tons reported in 1925. As the unusually heavy imports of manganese into France during 1926 make that country one of the largest consumers of manganese in the world—second only to the United States—a brief review of the steel industry of France is given. The reader should note that in the United States the ratio of manganese consumed to the ton of steel manufactured is 13.6 pounds of metallic manganese to 1 ton of steel. On the basis of the steel manufactured in France in 1926, her imports of more than 600,000 tons of manganese ore indicate a consumption per ton of steel manufactured of about 60 pounds of manganese.

The Mining Journal, London, May 21, 1927, page 456, gives the consumption of manganese in alloys as follows:

> The French ferromanganese production in 1926 is reported at approximately 50,000 tons [metric], obtained partly from the blast furnace and partly from the electric furnace, the principal producers being, according to the Journal du Four Électrique, the Société des Aciéries de Paris et Outreau (30,000 tons) and the Société de Pompey (9,000 tons), while some 9,000 tons were produced by the electrometallurgical works in the Alps and the Pyrenees regions. Imports into France and the Saar amounted to about 23,000 tons, an increase of 5,000 tons on the year, Norway supplying 13,700 tons, Great Britain 4,300 tons, Belgium and Luxemburg 3,200 tons, and Sweden 1,400 tons. The French production of ferrosilicon was about 23,500 tons, of which over 19,000 tons came from the Alps works. The imports amounted to 2,400 tons, of which about half came from Norway, and the exports to 2,300 tons, most of which went to Belgium and Luxemburg. The production of other ferros was 20,500 tons, the imports being about 700 tons and the exports 1,970 tons. The production of spiegel is reported at 105,000 tons.

Of the many industries of France, the first to feel with severity the fluctuations of the franc has been the manufacture of iron and steel. On December 1, 1926, out of a total of 217 blast furnaces, 154 were in operation, 33 idle, and 30 either under construction or repair. From January 1 to November 30, 1926, the production of pig iron was 8,565,549 tons. During the same period the output of raw steel amounted to 7,645,188 tons, made up of 7,514,595 tons of ingots and 130,653 tons of castings. As to the methods of manufacture, 5,276,653 tons were accounted for as basic steel, 2,223,422 tons as open hearth, 76,138 tons as electric steel, and 55,089 tons as Bessemer.[30]

RUMANIA

In the Mining Journal of London, August 26, 1926, page 719, the following paragraph appears:

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[29] Engineering and Mining Journal, vol. 122, Dec. 11, 1926, p. 948.
[30] Times Trade and Eng. Sup., Jan. 8, 1927, p. 397.

It is reported that an Anglo-Belgian financial group is endeavoring to obtain from the Rumanian Government concessions to develop manganese-ore deposits in Transylvania, etc.

MADAGASCAR

The deposits of Madagascar have been carefully examined. Production for the first six months of 1926 was 2,100 long tons of manganese dioxide.[31]

RÉSUMÉ OF THE INTERNATIONAL SITUATION

Some of the principal developments during the year are as follows: The renewal of the concession on the Nikopol deposits of the Ukraine by the Soviet Socialist Republic of Russia; the position attained by the Gold Coast deposits in furnishing, through Norway and Canada, comparatively large tonnages of ferromanganese; the exporting of ferromanganese from India; and in the United States the entrance of a large steel manufacturer into the ferromanganese market. These developments have in part materially influenced the world's flow of manganese and have changed the major source of the supply of some important countries.

Prior to 1914 Germany was one of the largest importers of Tchiaturi ore (Caucasus, Georgia), and up to the granting of the concession of June 12, 1925, Germany commercially controlled, through her nationals, approximately 46 per cent of the output of Tchiaturi, through actual operation in the Gelsenkirchener Bergwerks und Hüttenverein and a control of the company of Tchiaturi Manganese Producers (Ltd.). In the past approximately 43 per cent of the Georgia output went to Germany. In 1920 Germany, through her agents, dominated and controlled the policies of Tchemo, an association composed of the then manganese producers of Georgia and the Georgian Republic. This organization was formed in order to meet, by a highly organized producing and selling agency, the competition of other countries. On March 27, 1923, the Soviet Government recognized the Society of Tchemo and set up the special Manganese Mining Board of Georgia, controlling the entire manganese industry. Such firms as the Gelsenkirchen Co. (German) and the Hamburg Kaukasischer Grübenverein (German) were represented on this board. Late in 1924 negotiations were entered into by United States nationals and the Soviet Government at Moscow for an exclusive right for mining and shipping the manganese ores of Georgia. The result of these negotiations was the granting on June 12, 1925, of a 20-year concession to the American company.

In 1924 a German firm, Rawack & Grünfeld Co., entered into negotiations for the exclusive right to sell iron and manganese ore for export to all countries from Ukraine. The concession was granted this firm in January, 1925. The result has been the rapid development of the Nikopol deposits and in January curtailed consumption of Tchiaturi ore and increased imports of Indian ore. The Tchiaturi deposits unquestionably can, if unhampered by high royalties, undersell the Nikopol product, even in Germany.

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[31] Bull. des Mines de Madagascar, May, 1926, No. 41, 17 pp.

The position of England as an importer of ore and exporter of alloy will be modified by the increased manufacture of ferromanganese in the United States, Norway, Canada, and India. During the year an agreement was entered into by the British manufacturers of ferromanganese and the Central Provinces Manganese Ore Co. (Ltd.), of India, which will assure an adequate supply of manganese to the British manufacturers of steel. Imports of manganese ore by France during 1926 were the largest yet attained. This record may be attributed in part to the European steel cartel. There is no duty on manganese or manganese alloys between France and Germany. Italy's position in the manganese industry is that of a manufacturer of ferromanganese.

At present, the major countries of the world rank thus as consumers: United States, France, Great Britain, Germany, Belgium, and Italy.

The possibilities for the consumption of manganese in various steel-making countries may be partly gauged by the accompanying table, which shows their estimated capacity as producers of steel.

Estimated capacity of steel industry of various countries[32]

	Long tons
United States	49,000,000
Germany	15,700,000–17,700,000
England	9,300,000
France	8,900,000
Belgium	3,900,000
Austria	3,000,000
Luxemburg	2,500,000
The Saar	2,000,000
Italy	740,000
The Netherlands	230,000

SUMMARY

During the past few years the control exercised by nationals of the United States over sources of manganese through companies whose operations they have financed has led to a rather rapid elimination of what might be termed "the free market." This policy has been followed in part by other nations—for example, the consolidation of some of the English manufacturers of ferromanganese with the Central Provinces Mining Co. (Ltd.), of India—and in consequence the production from sources of manganese that are without consumer affiliations has been in part, at least, restricted. The present control of the Tchiaturi deposit by lease; the possible control by contracts for purchase of ore of the Insuta-Dagwin deposits, Gold Coast, by nationals of the United States; the ownership of Brazilian deposits by the United States Steel Corporation; the acquisition of the Postmasburg deposits, South Africa, by an American corporation; and the German control of the Nikopol deposits of the Ukraine have led to the tendency by the nationals of these groups to utilize the ores in which they are interested. Prior to the World War the larger part of the shipments from the Tchiaturi deposit was absorbed by Germany, but since 1925 the United States has become the largest consumer. In the past France, Belgium, and Italy drew on the

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[32] Estimated capacity of various countries has been based on "Résumé of conditions in European iron and steel industries," Commerce Reports, Jan. 24, 1927, p. 211.

Tchiaturi deposit extensively for their needs. During the last two years France has become the second largest purchaser of manganese in the world, and her needs are supplied largely from India, Russia, and Spain.

The reported development of the Djebel-Bou-Arfa deposits 100 kilometers northwest of Figuig, Morocco, gives France a potential source that may supply an appreciable part of her needs. The ability of Australia, the Netherlands East Indies, Chile, Cuba, China, and other countries to produce comparatively large tonnages of high-grade ore at price makes available to the world in part what might be termed " free ore."

WORLD'S PRODUCTION AND IMPORTS

The following tables, which show the world's production of manganese ore and the imports into the principal consuming countries, by sources, if taken in conjunction with the tables (already given under India, Russia (Nikopol and Tchiaturi), Gold Coast, and Brazil) which show the manganese exports to the consuming countries from the major producing countries, show the world flow of manganese. The table of imports brings out the fact that the large consuming countries depend upon foreign countries for their needs. C. K. Leith, in the introduction to International Control of Minerals, page 7, says:

> No country is entirely self-sufficing in regard to either supplies or markets for all mineral commodities; in every country certain minerals are available in excess of exports, while others are deficient and must be imported either in crude or manufactured form. International exchange of minerals can not be avoided if all parts of the world are to be supplied with needed minerals.

With the exception of Russia and Czechoslovakia, all the nations of Europe, as well as the United States, are deficient in manganese and supply their needs by importing high-grade ore. Russia's needs of steel are largely supplied from the Nikopol deposits; at present the industry requires approximately 200,000 tons per annum; little ore produced in Tchiaturi finds its way into the domestic market. The interdependence of nations for a metal that is essential to our present civilization is indicated by these tables.

Stocks in countries of production may be approximated by taking the difference between the production and exports. India, as previously stated, in 1925 and 1926 added about 423,760 tons to any stocks at the mines at the end of 1924.

The exports of Cuba were not tabulated as they are relatively small, from a world standpoint, and virtually all of them went to the United States; in 1926 the amount of ore produced in excess of shipments to the United States made the stocks on hand approximately 10,000 tons.

Manganese ore produced in the principal countries, 1922–1926, in metric tons

[Prepared by L. M. Jones, of the Bureau of Mines]

Country [1]	Percentage of manganese	1922	1923	1924	1925	1926
North America:						
Canada	35–50	66	181	530	----------	----------
Cuba	36–48	4,351	19,636	25,310	[2] 23,757	[2] 14,338
Mexico	40+	----------	2,246	1,800	3,333	4,000
Panama [2]	50±	(3)	[4] 406	----------	----------	----------
United States—						
Continental (exclusive of fluxing ore)	35+	13,619	32,006	57,422	99,902	47,000
Porto Rico [5]	35+	(6)	2,799	4,698	4,260	1,440
South America:						
Brazil	38–50	[5] 340,706	[5] 235,831	[5] 159,229	331,827	260,536
Chile	40–50	900	4,287	4,243	11,062	(6)
Europe:						
Czechoslovakia	----------	23,557	42,053	79,133	54,054	(6)
France	30+	5,224	5,993	5,000	4,002	2,625
Germany	30+	5,532	10,245	3,554	144	(6)
Great Britain	30+	254	2,053	2,496	842	130
Greece	43+	----------	----------	5,726	(6)	(6)
Hungary	30	----------	403	1,217	3,100	(6)
Italy	30–50	4,529	9,605	12,189	14,984	14,010
Portugal	38–60	239	[5] 13	[5] 125	(6)	(6)
Rumania	42	5,392	12,511	6,482	5,368	(6)
Russia [7]	41–48	90,739	240,885	500,693	816,507	1,587,000
Spain	29+	25,455	28,615	20,840	36,072	44,947
Sweden	45+	4,510	5,045	10,881	10,941	(6)
Yugoslavia	----------	1,122	5,143	4,570	2,716	1,244
Asia:						
China [5]	50–55	19,230	27,672	38,538	43,260	42,460
India—						
British	47–52	482,015	706,210	815,894	852,934	1,031,218
Portuguese [5]	42–46	(6)	(6)	(6)	(6)	3,089
Japan	50+	4,440	5,494	7,585	12,040	(6)
Netherland East Indies	45–52	3,233	5,243	8,482	10,997	11,393
Africa:						
Algeria [5]	----------	----------	651	406	450	577
Egypt	30+	104,143	132,384	150,194	80,567	121,868
Gold Coast [5]	50+	67,174	141,875	259,441	362,897	(6)
Morocco (French) [5]	50	----------	----------	----------	679	306
Tunisia	30–43	180	1,153	3,220	1,655	1,550
Union of South Africa	40–60	157	592	930	471	[8] 587
Oceania:						
Australia—						
New South Wales	----------	2,436	2,597	4,457	1,183	1,311
Queensland	50±	68	75	----------	----------	20
Victoria	50±	152	----------	----------	----------	----------
South Australia	45–56	649	171	321	----------	----------
Western Australia	47+	18	[5] 22	60	----------	[5] 83
New Caledonia	----------	1,083	64	----------	----------	----------
New Zealand [5]	52+	----------	8	6	----------	----------

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[1] In addition to the countries listed, Madagascar and Turkey produce manganese, but statistics of annual output are not available.

[2] Imports into the United States.

[3] Less than 1 ton.

[4] Manganese content of ore.

[5] Exports.

[6] Data not available.

[7] Data relate to year ended Sept. 30; data relate to "crude ore."

[8] Sales and shipments.

Manganese ore produced in the principal countries, 1922–1926, in long tons

[Prepared by L. M. Jones, of the Bureau of Mines]

Country[1]	Percentage of manganese	1922	1923	1924	1925	1926
North America:						
Canada	35–50	65	179	521	----------	----------
Cuba	36–48	4,282	19,326	24,910	[2] 23,382	[2] 14,112
Mexico	40+	----------	2,211	1,772	3,280	3,937
Panama[2]	50±	([3])	[4] 400	----------	----------	----------
United States—						
Continental (exclusive of fluxing ore)	35+	13,404	31,500	56,515	98,324	46,258
Porto Rico[5]	35+	([6])	2,754	4,624	4,193	1,417
South America:						
Brazil	38–50	[5] 335,326	[5] 232,107	[5] 156,715	326,585	256,420
Chile	40–50	886	4,219	4,176	10,887	([6])
Europe:						
Czechoslovakia	----------	23,185	41,389	77,883	53,200	([6])
France	30+	5,142	5,898	4,921	3,939	2,584
Germany	30+	5,445	10,083	3,498	142	([6])
Great Britain	30+	250	2,021	2,457	829	128
Greece	43+	----------	----------	5,636	([6])	([6])
Hungary	30	----------	396	1,198	3,051	([6])
Italy	30–50	4,457	9,453	11,997	14,747	13,789
Portugal	38–60	235	[5] 13	[5] 123	([6])	([6])
Rumania	42	5,307	12,313	6,380	5,283	([6])
Russia[7]	41–48	89,306	237,081	492,787	803,614	1,560,000
Spain	29+	25,053	28,163	20,511	35,502	44,237
Sweden	45+	4,439	4,965	10,709	10,768	([6])
Yugoslavia	----------	1,104	5,062	4,498	2,673	1,224
Asia:						
China[5]	50–55	18,926	27,235	37,929	42,577	41,790
India—						
British	47–52	474,401	695,055	803,006	839,461	1,014,928
Portuguese[5]	42–46	([6])	([6])	([6])	([6])	3,040
Japan	50+	4,370	5,407	7,465	11,850	([6])
Netherland East Indies	45–52	3,182	5,160	8,348	10,823	11,213
Africa:						
Algeria[5]	----------	----------	641	400	443	568
Egypt	30+	102,499	130,294	147,822	79,294	119,944
Gold Coast[5]	50+	66,113	139,634	255,343	357,165	([6])
Morocco (French)[5]	50	----------	----------	----------	668	301
Tunisia	30–43	177	1,135	3,169	1,629	1,526
Union of South Africa	40–60	154	583	915	463	[8] 578
Oceania:						
Australia—						
New South Wales	----------	2,398	2,556	4,387	1,164	1,290
Queensland	50±	67	74	----------	----------	20
Victoria	50±	150	----------	----------	----------	----------
South Australia	45–56	639	168	316	----------	----------
Western Australia	47+	18	[5] 22	59	----------	[5] 82
New Caledonia	----------	1,066	63	----------	----------	----------
New Zealand[5]	52+	----------	8	6	----------	----------

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[1] In addition to the countries listed, Madagascar and Turkey produce manganese, but statistics of annual output are not available.

[2] Imports into the United States.

[3] Less than 1 ton.

[4] Manganese content of ore.

[5] Exports.

[6] Data not available.

[7] Data relate to year ended Sept. 30; data relate to "crude ore."

[8] Sales and shipments.

Manganese ore imported into the principal consuming countries, 1924–1926, by countries from which imported, in long tons[1]

Importing country	Country from which imported	1924	1925	1926	Source of information
Belgium-Luxemburg Economic Union.	Brazil	8,131	6,103	2,076	Official trade returns.
	British India	108,738	134,312	154,031	
	Egypt	27,852	3,037	26,498	
	Portuguese India	5,590	10,197	4,486	
	Russia	14,949	41,221	65,819	
	Other countries	12,972	2,080	11,484	
		178,232	196,950	264,394	
France	Brazil	6,443	14,142	12,482	Commerce Extérieur de la France.
	British India	236,124	193,199	239,541	
	British West Africa	(2)	46,780	37,074	
	Russia	----------	48,539	90,534	
	Spain	26,841	43,377	47,880	
	Other countries of Asia	164,347	42,967	40,531	
	Other countries		73,143	132,961	
		433,755	462,147	601,003	
Germany	Brazil	258	10,463	5,977	Official German trade statistics.
	British India	15,336	68,063	46,536	
	British West Africa	----------	15,330	6,511	
	Dutch East Indies	1,422	1,726	4,206	
	Egypt	1,074	12,768	17,054	
	Russia in Europe	9,183	6,713	58,420	
	Russia in Asia	4,171	55,284	33,058	
	Other countries	9,134	25,879	24,208	
		40,578	196,226	195,970	
Great Britain	British countries:				Annual Statement of the Trade of the United Kingdom with Foreign Countries and British Possessions.
	British India	190,343	170,096	(3)	
	Gold Coast	44,820	14,148	(3)	
	Other British countries	760	593	(3)	
		235,923	184,837	(3)	
	Foreign countries:				
	Brazil	13,390	11,908	(3)	
	Japan and possessions	73	27	(3)	
	Netherlands	178	442	(3)	
	Portuguese possessions in India.	20,305	20,317	(3)	
	Russia	53,403	55,985	(3)	
	Spain	----------	2,051	(3)	
	Other foreign countries	2,039	3,080	(3)	
		89,388	93,810	(3)	
		325,311	278,647	144,308	
Japan	British India	1,179	----------	(3)	Annual Report of the Empire of Japan.
	China	46,730	43,373	(3)	
	French Indo-China	130	----------	(3)	
	Kwantung Province	----------	2	(3)	
	Straits Settlements	----------	8,269	(3)	
	Other countries	5	1,151	(3)	
		48,044	52,795	(3)	
Netherlands	Belgium	(3)	139	58	Maandstatistiek van den in-uit-en Doorvoer.
	Dutch East Indies		1,714	1,361	
	Egypt		1,000	----------	
	France		246	438	
	Germany		381	179	
	Italy (Fiume)		24	386	
	Norway		5	140	
	Other countries		137	2	
		1,984	3,646	2,564	

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[1] Data furnished by mineral section, Bureau of Foreign and Domestic Commerce, at the request of the Bureau of Mines.

[2] Included with other countries in 1924.

[3] Imports by countries not available.

Manganese ore imported into the principal consuming countries, 1924–1926, by countries from which imported, in long tons—Continued

Importing country	Country from which imported	1924	1925	1926	Source of information
United States	Africa (British):				Foreign Commerce and Navigation of the United States.
	South	----------	----------	12,946	
	West	47,988	66,146	100,614	
	Brazil	114,455	228,438	272,287	
	British India	113,679	48,967	63,742	
	Canada	125	2,498	417	
	Chile	2,454	7,154	8,213	
	China	----------	510	----------	
	Cuba	23,065	12,745	14,112	
	Germany	100	96	150	
	Hong Kong	579	1,296	----------	
	Italy	----------	----------	6,083	
	Java and Madura	----------	----------	594	
	Netherlands	7,567	10	25	
	Norway	----------	----------	3,542	
	Russia in Europe	85,618	238,618	254,885	
	Turkey in Europe	109,494	----------	----------	
	United Kingdom	10	3,275	206	
		505,134	[4] 609,753	737,816	

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[4] This figure differs from estimate shown on page 142 and is due to difference between figures furnished by the producers of Cuba and those furnished by the Bureau of Foreign and Domestic Commerce.

SILVER, COPPER, LEAD, AND ZINC IN THE CENTRAL STATES[1]

(MINE REPORT)

By J. P. Dunlop and H. M. Meyer

INTRODUCTION

The silver, copper, lead, and zinc mines of the Central States are in Arkansas, Illinois, Kansas, Kentucky, Michigan, Missouri, Oklahoma, and Wisconsin. The territory thus embraced lies in the great interior valley province of the United States, which extends from the Appalachian system to the Rocky Mountain front, exclusive of the Black Hills. Most of the mines are in the Paleozoic sedimentary rocks of this province, but the copper range of northern Michigan comprises lavas and intercalated sediments of pre-Cambrian age.

In the lead and zinc regions of the Central States the material sold is mainly concentrates,[2] and payment is made according to a basic price for concentrates of a certain quality. The details of this method are given in the pages devoted to Missouri in this report for 1914. The figures reported by producers represent the quantity and assay contents of concentrates sold and the amount received in payment. The total metal produced is calculated from the first two of these items.

The operators in Michigan report the quantity of concentrates produced and the actual recovery of copper from concentrates smelted. In any year the mines may produce more or less concentrates than are smelted during the same period. The copper content of concentrates produced but not smelted during the year has been estimated on the basis of the average copper recovery per ton for the year of the company producing it.

TENOR OF LEAD AND ZINC ORES OF THE CENTRAL STATES

Much of the ore mined in the Western States is crude smelting ore—that is, it can be smelted directly without preliminary concentration. All but a very small part of the ore from the Central States, however, is of such tenor that it requires concentration. The only fair basis for comparison of the relative magnitude of mining operations in different States is that of quantity of crude ore, or "dirt." In Kentucky and southern Illinois the lead and zinc concentrates are recovered as by-products in the concentration of the fluorspar that they accompany, and it is not possible to calculate the metal content of the crude ore raised.

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[1] A bibliography is given in Mineral Resources for 1919 and some preceding volumes.

[2] In local usage the ore as mined is called "dirt," and the concentrates are classed as "ore." Where the capacity of a concentrating plant is given, such capacity is to be understood as based on a 10-hour shift unless otherwise stated.

Quantity and tenor of copper, lead, and zinc ores of Central States, 1924–1926

State	1924		1925		1926	
	Ore	Metal content[1]	Ore	Metal content[1]	Ore	Metal content[1]
	Short tons	*Per cent*	*Short tons*	*Per cent*	*Short tons*	*Per cent*
Arkansas	(2)	----------	(2)	----------	(2)	----------
Illinois (northern)	148,300	1.71	232,000	1.49	245,100	1.49
Kansas	3,215,000	4.09	4,165,000	3.87	4,717,500	3.66
Michigan	5,372,572	1.26	7,036,751	1.10	7,641,682	1.15
Missouri	6,518,800	3.30	6,872,000	3.38	7,287,100	3.30
Oklahoma	8,804,000	4.24	10,605,200	3.81	10,934,000	3.48
Wisconsin	652,000	2.97	1,003,700	2.72	1,440,300	2.51
	24,710,672	----------	29,914,651	----------	32,265,682	----------

[1] The percentages given in this column represent the metal content of the ore in so far as it is recovered in the concentrates. In Michigan the metal so recovered is copper; in the other Central States the metals are lead and zinc, the relative proportions of which are shown in the table on another page and in the tables of tenor of ore given in the sections devoted to the respective States.

[2] No record of ore treated.

The marked gain in 1926 shown by this table was distributed among the lead and zinc mines of Oklahoma, southwestern Missouri, Wisconsin, and Kansas and the copper mines of Michigan. There were smaller increases in the output of lead or zinc ores in southeastern Missouri and in Illinois.

The low average tenor of the ore treated in the Central States in 1926 is best shown by the fact that the average value of the total metal content was only $4.41 a ton of ore treated. This value was 42 cents less than in 1925, because of the lower prices of copper, lead, and zinc. The 24,624,000 tons of zinc, lead, and lead-zinc ores treated in the Central States, exclusive of southern Illinois, Kentucky, and Arkansas, in 1926 yielded lead and zinc concentrates that sold for $83,504,204; consequently the mine operators realized an average of $3.39 a ton of ore mined and treated, compared with $3.99 a ton in 1925. The value of both lead and zinc concentrates was greater in 1925 than in 1926. The quantity of lead concentrates decreased 18,606 tons; the quantity of zinc concentrates increased 49,159 tons.

PRODUCTION

GENERAL STATISTICS

The total value of the mine production of silver, copper, lead, and zinc in the Central States in 1926 was $1,902,359 less than the value for 1925. The total value for 1907 to 1926 was $2,012,494,759—$786,706,802 for zinc, $653,280,301 for copper, $565,590,842 for lead, and $6,916,814 for silver. The value of the zinc has been much greater than that of the copper for the last eight years, hence the total value of the zinc produced during the period is $133,000,000 more than that of the copper.

Mine production of silver, copper, lead, and zinc in the Central States in 1926, by States

State	Silver		Copper		Lead		Zinc		Total value
	Fine ounces	Value	Pounds	Value	Short tons	Value	Short tons	Value	
Arkansas	--------	--------	--------	--------	18	$2, 880	87	$13, 050	$15, 930
Illinois	2, 990	$1, 866	--------	--------	655	104, 800	2, 577	386, 550	493, 216
Kansas	--------	--------	--------	--------	28, 463	4, 554, 080	126, 307	18, 946, 050	23, 500, 130
Kentucky	--------	--------	--------	--------	58	9, 280	1, 838	275, 700	284, 980
Michigan	105, 242	65, 671	175, 381, 565	$24,553,419	--------	--------	--------	--------	24, 619, 090
Missouri	90, 000	56, 160	1, 077, 000	150, 780	207, 012	33, 121, 920	26, 018	3, 902, 700	37, 231, 560
Oklahoma	--------	--------	--------	--------	69, 704	11, 152, 640	272, 567	40, 885, 050	52, 037, 690
Wisconsin	--------	--------	--------	--------	1, 546	247, 360	26, 800	4, 020, 000	4, 267, 360
	198, 232	123, 697	176, 458, 565	24, 704, 199	307, 456	49, 192, 960	456, 194	68, 429, 100	142, 449, 956
Total, 1925	228, 957	158, 896	155, 169, 588	22, 034, 081	317, 375	55, 223, 250	440, 369	66, 936, 088	144, 352, 315

Silver.—Nearly all the silver that has been produced in the Central States has been recovered incidentally in the production of other metals. The output in 1926 from the copper lodes of Michigan showed a decrease of 34,257 ounces from 1925, and that from the treatment of lead ore from Missouri increased 6,660 ounces. The lead-zinc fluorspar deposits of the Kentucky-Illinois field also carry silver, and the silver recovered from the lead concentrates from Illinois in 1926 was 2,990 ounces, a decrease of 10 ounces.

Copper.—The mine production of copper in the Central States in 1926 came from Michigan and Missouri. Michigan, which, as in other years, contributed nearly all of the output, produced 20,224,077 pounds more than in 1925. The copper produced in Missouri was nearly all derived from copper matte from lead smelters; only one car of copper ore was shipped in 1926.

Lead.—The mine production of lead in the Central States in 1926 decreased 3 per cent in quantity. Missouri produced 67.3 per cent of the yield, against 66.7 per cent in 1925, and the recoverable lead content of galena and lead carbonate concentrates mined in Missouri was equivalent to 30.4 per cent of the refined primary lead recovered in the United States from domestic ore. Of the total output in Missouri the disseminated-lead district of southeastern Missouri produced 203,003 tons, again exceeding the output of the Coeur d'Alene region of Idaho and that of the State of Utah and retaining first place in the production of lead in the United States. Small shallow lead mines and barite mines in southeastern Missouri reported the recovery of 59 tons of lead. Southwestern Missouri had an output of 3,950 tons, or 1,299 tons more than in 1925. The production, as measured by ore sold or treated, in Oklahoma decreased from 79,946 tons in 1925 to 69,704 tons in 1926, partly because much galena ore milled was held in bins at mines and not sold in 1926. The production from Kansas mines increased from 22,775 tons in 1925 to 28,463 tons in 1926. Production in Illinois declined from 1,001 to 655 tons and in Wisconsin from 1,877 to 1,546 tons. The total output of lead from mines in the southern Illinois-Kentucky region, Arkansas, and the upper Mississippi Valley amounted to less than 1 per cent of the output of the Central States.

Zinc.—The mine production of zinc in the Central States was 74.5 per cent of the total smelter output of primary zinc from domestic ores in the United States, as compared with 79 per cent in 1925. Oklahoma produced 272,567 tons of zinc in 1926, against 283,371 tons in 1925. For many years, prior to and including 1917, Missouri had been the largest producer of zinc in the United States; in 1917 the output was 132,918 tons but was only 26,018 tons in 1926. The production of zinc in Kansas rose from 56,225 tons in 1922 to 100,969 tons in 1923, 105,392 tons in 1924, 118,778 tons in 1925, and 126,307 tons in 1926. The Arkansas output increased from 43 tons in 1925 to 87 tons in 1926, Kentucky increased from 429 to 1,838 tons, and Illinois decreased from 2,724 to 2,577 tons. No production of lead or zinc was reported from Iowa mines in 1926.

PRODUCTION OF LEAD AND ZINC BY REGIONS

The productive lead and zinc territory in the Central States naturally falls into seven regions, three of which are not limited to a single State. For statistical purposes the tables showing the production of lead and zinc by States are necessary, but for practical purposes it is desirable to show the production by the natural regions irrespective of State lines.

The seven regions, in order of size of output, are: (1) The Joplin region, comprising southwestern Missouri, southeastern Kansas, and northeastern Oklahoma; (2) southeastern Missouri, containing the great deposits of disseminated lead; (3) the upper Mississippi Valley region, including all the lead and zinc mines in southwestern Wisconsin, Iowa, and northwestern Illinois; (4) the fluorspar region in southern Illinois and western Kentucky; (5) Arkansas; (6) central Missouri; (7) the Arbuckle Mountain region, in southern Oklahoma.

The southeastern Missouri region produced 66 per cent of the lead output of the Central States and 30 per cent of the primary lead recovered from domestic ore smelted or refined in the United States in 1926. The Joplin region yielded 33 per cent of the lead and 93 per cent of the zinc of the Central States in 1926 and was much the largest producer of zinc in the United States, yielding 69 per cent of the total slab zinc produced from domestic ores in 1926, and 75 per cent in 1925.

The lower zinc content of the zinc concentrates produced at mines in the upper Mississippi Valley region is clearly indicated by the fact that, although these mines yielded 12 per cent of the total output of raw zinc concentrates of all classes, the zinc content of such concentrates was only 6.4 per cent of the zinc from mines in the Central States.

The lead content of the galena concentrates shipped from the upper Mississippi Valley region averaged about 70 per cent, that of the concentrates from the Joplin region averaged about 78.5 per cent, and that of the concentrates from the southeastern Missouri region averaged 69 per cent. A very small proportion of the galena shipped from the Joplin region contained more than 82 per cent lead. A large part of the sphalerite shipped from the Joplin region contained about 59 or 60 per cent of zinc, and more than 20,000 tons shipped from the Waco and Smithfield districts in that region averaged 61.5 per cent.

Mineral Resources for 1914 contains brief reviews of the history of lead and zinc mining in the Central States, the yearly production of each State for the period 1907 to 1914, inclusive, and historical notes and estimates of the total production of lead and zinc in each State before 1907.

Mine production of lead and zinc in the Central States in 1926, by regions

Region	Lead[1]		Zinc[2]		Total value
	Short tons	Value	Short tons	Value	
Concentrates:					
Joplin	132,676	$14,096,438	823,643	$38,412,521	$52,508,959
Southeastern Missouri	300,480	28,239,733	2,301	101,243	28,340,976
Upper Mississippi Valley[3]	2,705	255,551	114,444	2,398,718	2,654,269
Kentucky-southern Illinois	706	65,422	5,060	133,888	199,310
Arkansas	28	2,544	254	7,358	9,902
	436,595	42,659,688	945,702	41,053,728	83,713,416
Total, 1925	455,201	48,167,097	896,543	43,327,837	91,494,934
Metal:					
Joplin	102,117	16,338,720	423,800	63,570,000	79,908,720
Southeastern Missouri	203,062	32,489,920	1,092	163,800	32,653,720
Upper Mississippi Valley[3]	1,819	291,040	29,377	4,406,550	4,697,590
Kentucky-southern Illinois	440	70,400	1,838	275,700	346,100
Arkansas	18	2,880	87	13,050	15,930
	307,456	49,192,960	456,194	68,429,100	117,622,060
Total, 1925	317,375	55,223,250	440,369	66,936,088	122,159,338

[1] Includes both galena and a small quantity of lead carbonate concentrates.
[2] Includes sphalerite, zinc carbonate, and zinc silicate concentrates.
[3] Includes Iowa, northern Illinois, and Wisconsin.

ARKANSAS

By J. P. DUNLOP

The value of the lead and zinc from Arkansas mines was $1,430,668 in 1917 but only $15,930 in 1926.

The production of galena in Arkansas is small. The shipments of zinc carbonate and zinc silicate concentrates in 1926, 246 tons, were less than 2 per cent of the shipments in 1917.

Mine production of lead and zinc in Arkansas, 1917–1926

Year	Lead concentrates (galena)		Zinc concentrates				Metal content[1]			
			Sphalerite		Silicate and carbonate		Lead		Zinc	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
1917	474	$47,593	916	$57,824	17,053	$650,585	382	$65,704	6,691	$1,364,964
1918	155	13,594	310	16,450	2,156	68,333	120	17,040	951	173,082
1919	35	2,400			510	18,170	28	2,968	189	27,594
1920	10	755			917	28,925	8	1,280	329	53,298
1921	27	1,510			42	580	21	1,890	15	1,500
1922	55	4,000			425	6,870	42	4,620	134	15,276
1923	32	2,559			444	9,919	25	3,500	148	20,128
1924	25	2,730			13	330	20	3,200	4	520
1925	93	8,546	58	2,380	44	1,296	58	10,092	43	6,536
1926	28	2,544	8	346	246	7,012	18	2,880	87	13,050

[1] In calculating the metal content of the ores from assays allowance has been made for smelting losses of both lead and zinc in 1921 to 1926. In comparing the values of ore and metal it should be borne in mind that the value given for the ore is that actually received by the producer, whereas the value of the lead and zinc is calculated from the average price for all grades.

Tenor of lead and zinc ore and concentrates produced in Arkansas, 1923–1926

	1923	1924	1925	1926
Total ore ... short tons	----------	(1)	(1)	(1)
Average lead content of galena concentrates ... per cent	78.1	80.0	63.4	64.0
Average zinc content of zinc silicate and carbonate ... do	37.8	----------	44.0	37.4
Average value per ton:				
Galena concentrates	$79.97	$109.20	$91.89	$90.86
Zinc silicate and carbonate	22.34	25.38	29.45	28.50

[1] The quantity of ore mined was very small, and very little of it was milled, so that no calculations as to tenor are available; part of the ore sold was taken from stock in bins.

The mines are chiefly in Boone and Marion Counties and the adjoining portions of Searcy and Newton Counties, but there are numerous prospects in Baxter, Izard, Sharp, Lawrence, and other counties to the east, and deposits have been worked in Washington and Sevier Counties, on the extreme western border of the State, and in Pike County, in the southwestern part of Arkansas.

The ores are galena, sphalerite, and smithsonite, and the concentrates produced are generally of high grade and free or nearly free from iron or lime. The sphalerite and smithsonite are shown by analysis to contain appreciable quantities of cadmium, especially in a yellow variety of smithsonite known locally as "turkey fat," which shows as much as 0.8 per cent of cadmium.

Few of the lead and zinc mines of Arkansas were worked in 1926, and none of those from which concentrates were shipped were operated steadily. Shipments of lead and zinc ores in 1926 came from five small mines, and the value of the concentrates shipped decreased from $12,222 in 1925 to $9,902 in 1926.

The only shipments of lead concentrates in 1926 were from Newton County, mainly from the Bald Hill mine, on land of the American Zinc, Lead & Smelting Co. A few tons of blende and also some zinc carbonate mined by Bud Lawhorn and others were shipped from Zinc by L. L. Brown. This ore was mined in Marion and Boone Counties. The largest shipments of zinc carbonate were from the Bald Hill mine in Newton County. The Morning Star 350-ton mill at Rush Creek, rebuilt in 1926, treated old tailings, but no shipments were made in 1926. The mill is to handle ore as well as tailings in 1927. There was no output of lead or zinc in Lawrence County, but the Campbell Zinc Co. drilled about 20 holes and sunk a shaft in 1926. This prospect was visited by H. D. Miser, of the United States Geological Survey, and a press bulletin giving the following information was prepared by him:

CAMPBELL SHAFT

The ore body studied by Mr. Miser at the bottom of the Campbell Zinc Co.'s No. 1 shaft, 8 feet square and 275 feet deep, three-fourths of a mile south of Black Rock, is especially interesting for the reason that it occurs largely in a brecciated conglomerate consisting of dolomite and limestone pebbles in an earthy matrix, about 250 feet below the surface of Black River, which flows nearby. The blende-bearing part of the conglomerate, which is estimated to average about 7½ per cent of metallic zinc, was revealed on the east and south sides of the shaft, where it ranges in thickness from 14 inches to 4 feet. The ore-bearing conglomerate occurs at the base of a thick bed of dolomite and rests upon light-gray limestone. The contact between the limestone and the dolomite is irregular, showing a difference of altitude in the shaft of 4½ feet.

Since the shaft was examined by Mr. Miser six drill holes, the deepest 340 feet deep, have been sunk at distances of 40 to 150 feet southeast, south, west, and northwest of the shaft. These holes, which were bored to determine the extent of the ore body explored by the shaft, indicate the existence of bodies of zinc blende at two levels. That at the lower level corresponds to the bedded ore body in the shaft and is reported to have been found in four of the recent drill holes at depths nearly the same as in the shaft. The ore-bearing zone thus lies in a nearly horizontal position and was found, according to report, to range in thickness from 5 to 17 feet. The effects of underground solution in the deeper zone are shown by softening of the matrix of the conglomerate in places and by the occurrence of open ground with dolomite crystals in the shaft and also in some of the drill holes.

The upper ore-bearing zone, as shown by the recent drill records, lies northwest, west, and southwest of the shaft. It is reported as being present in all drill holes in these directions and to range in thickness from 2 to 58.5 feet. It dips toward the west, as indicated by the depths at which its top was reached in the different drill holes. These depths range from 64 to 155 feet below the altitude of the mouth of the shaft, showing an inclined ore body not parallel to the lower one nor to the bedding of the rocks.

ILLINOIS

By J. P. Dunlop

PRODUCTION

Mine production of lead and zinc in Illinois in 1926, by districts [1]

District	Lead concentrates (galena)		Zinc concentrates (sphalerite)		Metal content [2]			
					Lead		Zinc	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
Northern Illinois	358	$37,238	13,151	$179,501	273	$43,680	2,577	$386,550
Southern Illinois	614	57,885			382	61,120		
	972	95,123	13,151	179,501	655	104,800	2,577	386,550
Total, 1925	1,418	141,570	11,957	212,438	1,001	174,174	2,724	414,048

[1] Mineral Resources for 1914 contains a historical review of lead and zinc mining in Illinois.

[2] In calculating the metal content of the ores from assays allowance has been made for smelting losses of both lead and zinc. In comparing the values of ore and metal it should be borne in mind that the value given for the ore is that actually received by the producer, whereas the value of the lead and zinc is calculated from the average price for all grades.

Tenor of lead and zinc ore and concentrates produced in Illinois, 1923–1926

	1923	1924	1925	1926
NORTHERN ILLINOIS				
Total ore ... short tons	86,100	148,300	232,000	215,100
Total concentrates in ore:				
Lead ... per cent	0.35	0.38	0.27	0.15
Zinc ... do	5.54	4.72	4.87	5.37
Metal content of ore:				
Lead ... do	.25	.26	.21	.11
Zinc ... do	1.85	1.45	1.28	1.38
Average lead content of galena concentrates ... do	71.0	71.2	78.6	77.9
Average zinc content of sphalerite concentrates ... do	33.4	30.7	26.3	25.6
Average value per ton:				
Galena concentrates	$77.54	$93.92	$105.71	$104.02
Sphalerite concentrates	$15.77	$16.07	$15.64	$13.65
SOUTHERN ILLINOIS				
Average lead content of galena concentrates ... per cent	67.6	65.6	67.0	64.2
Average zinc content of sphalerite concentrates ... do		59.77	59.9	
Average value per ton of galena concentrates	$75.68	$83.19	$95.26	$94.28

Mine production of silver in southern Illinois, 1917–1926

Year	Silver		Lead concentrates, silver bearing	
	Fine ounces	Value	Short tons	Ounces of silver per ton
1917	7,186	$5,921	1,239	5.80
1918	8,171	8,171	1,228	6.65
1919	4,440	4,973	715	6.16
1920	8,193	8,930	1,252	6.55
1921	1,345	1,345	181	7.43
1922	6,025	$6,025	1,100	5.48
1923	8,170	6,699	1,762	4.64
1924	8,891	5,957	1,678	5.30
1925	3,000	2,082	797	3.76
1926	2,990	1,866	614	4.87

The value of the mine production of silver, lead, and zinc in Illinois in 1926 was $493,216, as compared with $590,304 in 1925.

The lead and zinc deposits of Illinois fall into two distinct regions marked by different mineral associations and structural environment. Those of southern Illinois belong to the Kentucky-Illinois fluorspar district; those of northern Illinois belong to the upper Mississippi Valley region.

NORTHERN ILLINOIS

The lead and zinc mines of northern Illinois are all in Jo Daviess County, the extreme northwestern county of the State. The ores are galena, smithsonite, and sphalerite, though the first two are much less common now than formerly, when most of the deposits worked were shallow and above water level.

The entire output of northern Illinois is included under the Galena district, which comprises the mines from the vicinity of Fever River to the Wisconsin State line.

A small increase in the quantity of ore and a considerable increase in zinc concentrates from northern Illinois are shown in the accompanying tables. The average zinc content of concentrates recovered decreased slightly, but the ratio of concentrates to ore increased from 4.87 to 5.37 per cent. Most of the lead and zinc concentrates came from the Black Jack mine of the Mineral Point Zinc Co.

Tailings from the Walton land were milled by A. Hollander. Small operators did very little mining and virtually no prospecting. No new deposits of any importance were discovered.

SOUTHERN ILLINOIS

The lead and zinc deposits of southern Illinois are in Pope and Hardin Counties; they occur in rocks of Mississippian age in the northern extension of the Kentucky-Illinois fluorspar district. The chief product of the mines in recent years has been fluorspar, and the yield of galena is small compared with the output from other districts in the Central States.

The total production of galena concentrates in southern Illinois from 1906 to 1926 has been 15,842 tons, most of which has been shipped from the Fairview, Rosiclare, and Hillside mines. The shipments of zinc ores from the district have been comparatively small and scattered. The only recorded shipments of zinc carbonate, aggregating 103 tons, were made from the Empire mine in 1903 or 1904 and from four companies in 1906.

Formerly large bodies of galena near the surface were worked, but galena is now produced incidentally in the concentration of the fluorspar. For this reason it would be misleading to give the quantity of crude ore. The galena of southern Illinois is notably argentiferous as compared with the rest of the Mississippi Valley ores, and the silver content averaged between 3.76 and 7.43 ounces to the ton of lead concentrate for the last 10 years.

Sphalerite, or zinc blende, occurs much less plentifully than galena, and the first large shipments of sphalerite in many years were made in 1924 from the 250-ton plant of the Fairview Fluorspar & Lead Co., which reported no sales of zinc in 1926.

The shipments of galena concentrates from southern Illinois decreased from 797 tons in 1925 to 614 tons in 1926, and the silver recovered in treating the concentrates decreased from 3,000 to 2,990 ounces.

The Rosiclare Lead & Fluorspar Mining Co. reported no recovery of silver and lead in 1926. The mine and concentrating plant of the Hillside Fluor Spar Mines near Rosiclare were active in 1926 and produced most of the lead and silver. The shaft is 450 feet deep and the mill has a capacity of 200 tons per 8-hour shift. The galena concentrate, assaying 65.4 per cent lead and about 4.87 ounces of silver a ton, was shipped to the St. Louis plant of the National Lead Co.

IOWA

The lead and zinc deposits of Iowa extend along the Mississippi River for nearly 80 miles, in Dubuque, Clayton, and Allamakee Counties. No shipments of lead or zinc concentrates from mines in Iowa have been reported since 1918.

KANSAS

By J. P. Dunlop

Mine production of lead and zinc in Kansas in 1926, by districts

District	Lead concentrates [1]		Zinc concentrates		Metal content [2]			
					Lead		Zinc	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
Crestline	2,495	$269,277	8,408	$412,395	1,961	$313,760	4,391	$658,650
Blue Mound-Baxter Springs	33,764	3,536,560	212,415	10,163,045	26,149	4,183,840	110,142	16,521,300
Galena	[1] 490	43,107	574	24,438	342	54,720	300	45,000
Waco	15	1,419	21,710	1,076,378	11	1,760	11,474	1,721,100
	36,764	3,850,363	243,107	11,676,256	28,463	4,554,080	126,307	18,946,050
Total, 1925	29,480	3,497,679	228,383	12,034,387	22,775	3,962,850	118,778	18,054,256

[1] Includes 198 tons of lead carbonate, containing 60 per cent lead, from Galena.

[2] In calculating the metal content of the ores from assays allowance has been made for smelting losses of both lead and zinc. In comparing the values of ore and metal it should be borne in mind that the value given for the ore is that actually received by the producer, whereas the value of the lead and zinc is calculated from the average price for all grades.

Tenor of lead and zinc ore and concentrates produced in Kansas, 1923–1926

	1923	1924	1925	1926
Total ore short tons	2,680,700	3,215,000	4,165,000	4,717,500
Total concentrates in ore:				
Lead per cent	0.84	0.74	0.76	0.81
Zinc do	5.98	5.84	5.52	5.12
Metal content of ore:				
Lead do	.67	.59	.60	.62
Zinc do	3.59	3.50	3.27	3.04
Average lead content of galena concentrates do	79.4	79.4	78.9	79.1
Average zinc content of sphalerite concentrates do	60.0	60.0	59.1	59.0
Average value per ton:				
Galena concentrates	$96.78	$108.70	$115.39	$104.92
Sphalerite concentrates	40.76	42.52	52.70	48.03

The lead and zinc deposits of Kansas, so far as developed, are limited to Cherokee County, in the southeastern part of the State. They form the western extension of the ore deposits of the Joplin region and display the general characteristics shown in that region, except that here typical sheet-ground deposits have not been extensively developed.

It is difficult to ascertain the production for early years or to segregate the Kansas ores from those produced in the Missouri portion of the Joplin region. If to the figures for 1886 to 1903, published by the Kansas Geological Survey,[3] are added those for 1904 to 1926, published in Mineral Resources of the United States, a total of 2,375,570 tons of zinc concentrates and 362,166 tons of lead concentrates is shown as the approximate production of Kansas for 1886 to 1926. About 68 mines, of which 50 are in the Blue Mound-Baxter area, shipped lead or zinc in 1926.

The older mining area at Lawton and Badger-Peacock produced very little zinc and lead in 1926, and nearly all the production from Kansas came from the Blue Mound-Baxter district, an extension of the Miami field, and from the Waco camp, on the Kansas-Missouri State line. The Crestline district output of zinc concentrates was 2,420 tons more than in 1925, and that of Blue Mound-Baxter 12,372 tons more; the total increase in zinc concentrates from Kansas in 1926 was 14,724 tons.

Crestline district.—The production in the Crestline district, including shipments of galena and sphalerite from mines west of Badger, was 2,495 tons of galena and 8,408 tons of sphalerite, against 1,623 tons of galena and 5,988 tons of sphalerite in 1925. The Crutchfield mine contributed more than half of the lead concentrates shipped from the district in 1926, producing about 1 ton of lead to 2 of zinc. The output of the Andrew Bros. mine was largely galena concentrates, as was the output from the Chestnut, Thornton, and Cavern mines. The property of the Crestline Products & Service Co. shipped some galena and had the largest yield of blende concentrates in 1926; the adjoining Ellis mine was sold to the Crestline company after being operated until May, 1926, by the Eagle-Picher Lead Co.

The Crutchfield mine and mill of the Eagle-Picher Lead Co. were active all year. Much drilling and underground development was done, and the output was large. Drilling was active at Crestline in 1926, and virtually all the lands in the vicinity of producing properties are under lease. A new 150-ton mill was built at Badger by the Hamilton Mining Co., but was closed after a short run.

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[3] Haworth, Erasmus, and others, History, Geography, and Metallurgy of Galena-Joplin Lead and Zinc: Univ. Kansas Geol. Survey, vol. 8, 1904.

Lawton-Waco district.—The output of the Lawton-Waco district came from the mines near Waco, as the one property at Lawton—that of the Eastern Lead & Zinc Co.—was idle. The total output of the Waco district, which lies partly in Missouri and partly in Kansas, was 33,737 tons of sphalerite and 90 tons of galena, against 34,116 tons of sphalerite and 223 tons of galena in 1925. The production of the Kansas part of the district was 21,710 tons of sphalerite and 15 tons of galena, as compared with 21,905 tons of sphalerite and 72 tons of galena in 1925. The chief producers in the Kansas part of the district were the Butte-Kansas and the Acme mines, which were steadily busy. Three shafts were operated at the Butte-Kansas mines in ore at 220 to 295 feet. The Butte-Kansas mill has a capacity of 400 tons a shift. Four shafts were operated at the Acme; ore was mined at the 200-foot level and from a newly opened deposit at 285 to 300 feet. The old Acme 125-ton mill was replaced by a modern 500-ton plant to handle the ore which is now coming largely from the lower levels.

The Acme and Butte-Kansas mines, which were among the largest shippers of high-grade zinc concentrates in the district, were sold, together with the Barnsdall mine, to the Missouri-Kansas Zinc Corporation early in 1927.

One shaft was worked at the Liberal mine for a few weeks in 1926, and the output was small. The Barnsdall No. 3 also was worked spasmodically and had a small output compared with previous years. A tailing mill and sludge plant of 150 tons capacity was erected at Barnsdall No. 3 late in 1926, and a satisfactory recovery was made from the material treated. The 250-ton mill of the Grasselli Mining Corporation ran most of the year on ore from the 200-foot level. Considerable drilling was done, and a new shaft was sunk.

Galena district.—The production of lead concentrates in the Galena district was 292 tons of galena and 198 tons of lead carbonate, as compared with 592 tons of galena and 142 tons of lead carbonate in 1925. There were small shipments of sphalerite concentrates, 574 tons, derived from old dumps cleaned at chat mills and from one mine in the southwest part of the district. The galena was derived from clean-ups or from shallow mining, as the mines are flooded and no pumping was done in the years 1922 to 1926.

The largest producer of sphalerite was the D. A. Mining Co.; an 80-ton mill on the Wyandotte land was run by this company part of the year and was then abandoned. Small shipments of galena, lead carbonate, zinc silicate, and sphalerite were made by lessees on the Bonanza, Illinois, Empire, Connor, and Templar lands. Hand jigs were used to clean much of the ore and the only mills active were those of the McKinney Mining Co. and the D. A. Mining Co. The cut-ground area is large, and most of the old mines are connected under ground, so that few of the mines can be worked below the water level until the entire district is unwatered, which is not a probable development with ore at present price levels.

Blue Mound-Baxter Springs district.—There was not much drilling in the north of Cherokee County, but many drill rigs were busy around Baxter Springs, west along the Chetopa road, and on the road between Baxter Springs and Blue Mound. A little drilling was also done near Melrose, 6 miles west of the westernmost producing properties in Kansas. The possibility of much water at 350 to 400 feet depth, at which ore was found, the high royalties asked by lessors, and the decline in prices of lead and zinc early in 1926 caused most of the operators to either cancel their leases or postpone further drilling.

The success of the Liza Jane mine in working ore bodies found west of Baxter Springs, at depths of 290 to 325 feet, caused extensive drilling north, south, and west of that mine. In 1926 Frank E. Weeks sank a shaft on the Franklin lease, and is building a large mill in 1927, and the St. Louis Smelting & Refining Co. has a new shaft and did a considerable amount of drilling. The Commerce Mining & Royalty Co., Federal Mining & Smelting Co., and other operators also found the lower ore body by drilling. The lower ore was first found and worked at the Hartley mine, and the drilling has extended several miles west and north. Drilling was continued on the Goodwin and Harvey land east of Baxter Springs, and the land has been purchased by the Eagle-Picher Lead Co.

The Hartley mine near Baxter was sold to the Tri State Zinc Co., and the capacity of the mill is to be doubled. Several companies have developed bodies of ore ready for mills. One mill is under construction by the Matthiessen & Hegeler Zinc Co., and mills may be built in 1927 by the Commerce Mining & Royalty Co., St. Louis Smelting & Refining Co., and the Velie Mines Co.

New concentrating plants were erected by the following: Lawyers Mining Co. (No. 2 mill, 400 tons); Weepah Mining Co. (150-ton mill); Baxter Sludge Co. (mill at Baxter mine); T & G Milling Co. (Homestake tailings mill); C & H Milling Co. (Fox tailings mill); Southern (tailing mill).

The Barr, Blue Mound, Northern, Consolidated No. 10, Jarrett, Robinson, Fox, Bendelari, Monarch, West Side, Webber, Southern, Vantage No. 2, Tar Creek, Liza Jane, King Brand, Kansas Exploration, Lawyers, Black Eagle, Muncie, Consolidated No. 14, and Early Bird mines each shipped more than 500 tons of galena in 1926.

The mines that shipped more than 3,000 tons each of sphalerite in 1926 were the Barr, West Side, Webber, Wilbur, Liza Jane, Hartley, Southern, King Brand, Boska, Lucky Jew, Peru, Black Eagle, Cherokee, Chubb, Brewster, Muncie, Lawyers, Bendelari, Early Bird, Kansas Exploration (Jarrett), Kansouri (Federal), Northern, Consolidated No. 10, Robinson, Consolidated No. 14, Fox, Euterpe, and Monarch.

Most of the output in 1926, as in many years past, came from mines north and northwest of the Picher area and close to the State line, and mines north of Hockerville and east and north of Blue Mound produced 7,721 tons of galena and 41,342 tons of sphalerite in 1926.

The shipments of concentrates from the entire Blue Mound-Baxter area in 1925 amounted to 27,051 tons of galena and 200,043 tons of sphalerite; in 1926 there were 33,764 tons of galena and 212,415 tons of sphalerite. The average lead content of the galena sold was 79 per cent, and the zinc content of the sphalerite concentrates sold was 58.9 per cent. The ore ("dirt") milled yielded 6.11 per cent in concentrates, compared with 6.53 in 1925, and at some mines the recovery was more than 10 per cent. About 80.5 per cent of the zinc and 77 per cent of the lead shipped from the district came from mines west and northwest of Blue Mound.

The producing properties in the area west and northwest of Blue Mound were the Tri State Zinc Co. (Blue Diamond), Blue Mound (Century Zinc Co.), Consolidated Nos. 7, 10, and 14, Wilbur, Northern (Childress), Vinegar Hill (Barr), Webber, West Side, Early Bird, Southern, Tar Creek, Childress (Wade), Chubb, Robinson, Cherokee, Lucky Jew mine of Eagle-Picher, Black Eagle No. 2, Kansouri (Federal), Fox, Bendelari, Big John, Lawyers, Boska, King Brand, Muncie, and Jarrett (Federal). The producing properties north of Hockerville and Zincville and east and north of Blue Mound were the Brewster, Commonwealth No. 2, Euterpe, Hartley (Hutcheon), Harrington, Chicago No. 3, Empire, Independence, Barnsdall No. 5, Liza Jane, Kansas Line, Homestake (Federal), Brugger (Vantage), Brewster (Barnsdall No. 6), Hanenkratt, Peru, Connico, and Monarch.

The Tri State Zinc Co. acquired the Blue Diamond and Blue Mound leases, drilled some holes, and operated the tailing mill which has a capacity of 500 tons (10 hours). Flotation plants were installed at the Early Bird, Consolidated Nos. 7, 10, and 14, Tar Creek, Big John (Eagle-Picher), Liza Jane, Black Eagle, Muncie, Monarch, and Bendelari mines. The Wade mine was sold by the Childress Lead & Zinc Co. to the Consolidated Lead & Zinc Co. in June, 1926. The Lawyers Mining Co. bought the D'Armond lease and started building a 400-ton mill. The Independence Mining Co. bought the Racetrack mine in November, 1926, and drilled out some new ore bodies. Barnsdall No. 5 is now owned by W. F. Evans.

KENTUCKY

By J. P. Dunlop

Lead and zinc deposits occur in both central and western Kentucky. The central districts have not reported any shipments of lead or zinc for more than 20 years. The deposits in the fluorspar region of western Kentucky are chiefly in Crittenden, Caldwell, and Livingston Counties and form a continuation of those in the southern Illinois lead and zinc region.

Considerable quantities of galena ores have been produced in former years, but at present lead is obtained solely as a by-product in the recovery and concentration of fluorspar, which is the principal economic mineral. The galena recovered is argentiferous, and its silver content ranges from a very small quantity to more than 3 ounces a ton, but no recovery of this silver content has been reported by the smelters for many years.

Mine production of lead and zinc in Kentucky, 1917–1926

Year	Lead concentrates (galena)		Zinc concentrates				Metal content			
			Sphalerite		Zinc carbonate		Lead		Zinc	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
1917	184	$15,415	--------	----------	2,299	$78,368	123	$21,156	751	$153,204
1918	255	21,066	--------	----------	927	30,390	185	26,270	315	57,330
1919	120	7,250	--------	----------	120	3,600	86	9,116	36	5,256
1920	172	12,295	--------	----------	25	750	122	19,520	9	1,458
1921	100	3,693	--------	----------	621	19,800	69	6,210	220	22,000
1922	132	8,365	--------	----------	419	8,373	92	10,120	142	16,188
1923	78	6,152	--------	----------	850	17,925	53	7,420	270	36,720
1924	259	22,908	--------	----------	1,494	37,000	175	28,000	492	63,960
1925	251	23,619	--------	----------	1,217	29,740	152	26,448	429	65,208
1926	92	7,537	582	$17,471	4,478	116,417	58	9,280	1,838	275,700

The average lead content of galena concentrates in 1926 was 64.5 per cent. The total value of the lead and zinc concentrates shipped from Kentucky mines was $141,425, against $53,359 in 1925.

The sellers of galena concentrates in 1926 were the Franklin Fluorspar Co., Eagle Fluor Spar Co., and the Keystone Fluorspar & Lead Co. The Zinc & Spar Co. operated the Hudson mine, near Salem, Livingston County. The zinc carbonate ore and the zinc blende of 51 per cent grade came from workings 95 to 150 feet in depth and were treated in log washers and by jigs and tables before shipment. The Sheridan Zinc & Mining Co. operated two log washers on zinc carbonate ores mined through three shafts. This company was the largest producer of zinc carbonate concentrates in the Eastern and Central States.

MICHIGAN

By H. M. Meyer

PRODUCTION

The mine production of copper in Michigan increased 13 per cent in 1926, being 175,381,565 pounds, as compared with 155,157,488 pounds in 1925, and was the largest production in this State since 1919, when the total was 178,826,486 pounds. Figures based on smelter output show that Michigan was the principal copper-producing State in the country until 1887, when Montana displaced it. After 1887 Michigan was the second largest producing State until Arizona passed it in 1906. In 1914 Michigan was sent into fourth place by Utah but from 1915 until 1918 was again in third place. Michigan ranked either second or third from 1919 until 1923, when it went into fourth place; it has continued to rank fourth since 1923. The history of Michigan's displacement as the principal copper-producing State is interesting in that in it is reflected the rise and fall in importance of the different types of copper deposits. The first important production in this country was from the native copper deposits of Michigan; this was later overshadowed by the production from the vein deposits of Montana. Montana was displaced by Arizona, a large part of the production of which comes from large low-grade (so-called porphyry) deposits. The production of Utah, which has also passed that of Michigan, is mainly from large low-grade disseminated (porphyry) deposits.

Figures of mine production of copper and silver in Michigan for several years are given in the following tables:

Mine production of silver and copper in Michigan, 1921–1926[1]

Year	Silver (fine ounces)	Copper[2]			Concentrate ("mineral")[3]		Ore[4] ("rock") (short tons)
		Pounds	Yield		Pounds	Yield (per cent)	
			Pounds per ton of ore ("rock")	Percentage			
1921	310,727	86,370,028	23.9	1.19	148,024,931	58.4	3,610,648
1922	376,990	121,712,365	24.6	1.23	193,984,975	62.7	4,952,264
1923	223,997	138,304,080	25.8	1.29	220,055,091	62.8	5,363,160
1924	130,381	135,662,605	25.3	1.26	213,779,365	63.5	5,372,572
1925	139,499	155,157,488	22.0	1.10	241,056,386	64.4	7,036,751
1926	105,242	175,381,565	23.0	1.15	272,365,636	64.4	7,641,682

[1] The figures are based on the actual recovery of copper from "mineral" smelted and the estimated recovery from "mineral" that was not smelted during the year.

[2] Includes copper from sands.

[3] Includes "mineral" from sands.

[4] Includes sands.

Value of silver and copper produced in Michigan mines, 1921–1926

Year	Silver	Copper		Total
		Total	Per ton of ore ("rock")	
1921	$310,727	$11,141,734	$3.09	$11,452,461
1922	376,990	16,431,169	3.32	16,808,159
1923	183,678	20,330,700	3.79	20,514,378
1924	87,355	17,771,801	3.31	17,859,156
1925	96,812	22,032,363	3.13	22,129,175
1926	65,671	24,553,419	3.21	24,619,090

According to L. P. Barrett,[4] State appraiser of mines in Michigan, an average of 2.35 cents a pound, compared with 1.76 cents a pound in 1925, was realized on Michigan copper in 1926, and the total production cost per pound of copper from mines and reclamation plants in 1926 was 11.84 cents, compared with 12.556 cents in 1925.

The valuations of mines in the Michigan copper district, as recommended to the State appraiser of mines, are as follows:

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[4] Engineering & Mining Journal, vol. 123, June 4, 1927, p. 945.

Houghton County:	
Calumet & Hecla Consolidated Copper Co	$12,945,000
Copper Range Co	3,800,000
Isle Royale Copper Co	1,325,000
Quincy Mining Co	1,150,000
Arcadian Consolidated Copper Co	122,000
Franklin Mining Co	135,000
Mayflower-Old Colony Copper Co	90,000
Hancock Consolidated Mining Co	54,000
La Salle Copper Co	90,000
Superior Copper Co	22,000
Winona Copper Co	80,000
Keweenaw County:	
Calumet & Hecla Consolidated Copper Co	6,700,000
Mohawk Mining Co	2,108,000
Seneca Copper Mining Co	875,000
	29,497,000

The following data are abstracted from reports by the companies to their stockholders:

In 1926 the Calumet & Hecla Consolidated Copper Co. produced from its mines 73,297,924 pounds of copper at an average cost sold (but not including charges for depreciation and depletion) of 10.59 cents a pound. In addition, the reclamation plants at Lake Linden and Hubbell produced 30,988,076 pounds of copper at an average cost sold of 7.10 cents a pound. In 1925 the mines of this company yielded 64,250,000 pounds of copper and the reclamation plants 26,957,000 pounds. At the Tamarack reclamation plant at Hubbell considerable amygdaloid sand was encountered which lowered the average grade, but at Lake Linden the sand was above the average grade and a new high record of copper production was obtained. The combined results are as follows:

		1926	Since starting
Material treated	short tons	2,756,177	15,131,000
Assay headings	per cent	0.694	0.688
Assay tailings	do	.124	.166
Refined copper	pounds	30,988,076	158,675,000
Refined copper per ton treated	do	11.24	10.49

The Lake Linden stamp mills treated 618,400 tons of conglomerate rock and 202,000 tons of Osceola amygdaloid. The Ahmeek mill treated 1,134,267 tons from the Kearsarge branch and 331,946 tons from the Osceola. The company obtained options on 9,354.91 acres of land in Keweenaw County and took initial steps in a program of exploration and development. Dividends totaling $3,008,253 were paid in 1926 as in 1925.

The Isle Royale Copper Co. produced from its mines 11,017,000 pounds of copper at an average cost sold, but not including depreciation and depletion, of 11.46 cents a pound. The rock treated amounted to 447,747 tons, which yielded an average of 24.61 pounds to the ton. In 1925 this company treated 378,459 tons of rock and produced 9,543,000 pounds of refined copper.

The Baltic, Champion, and Trimountain mines in 1926 produced 23,526,277 pounds of refined copper, of which 14,696,867 pounds was for the Copper Range Co., as one-half of Champion's production belonged to St. Mary's Mineral Land Co. The Baltic mine hoisted 166,473 tons of rock, stamped 126,157 tons, and obtained 3,690,041 pounds of copper, or 29.25 pounds to the ton stamped; the Champion mine hoisted 511,530 tons of rock, stamped 454,654 tons, and obtained 17,658,820 pounds of copper, or 38.84 pounds to the ton; and the Trimountain mine hoisted 71,553 tons of rock, stamped 63,837 tons, and obtained 2,177,416 pounds of copper, or 34.11 pounds to the ton. In 1925 the three mines produced 23,277,718 pounds of copper, of which 14,298,916 pounds was for the Copper Range Co. The Champion and Trimountain mines were operated in 1926 at a profit, if depreciation and depletion be disregarded. Consideration of these two items, however, would very likely wipe out Trimountain's margin of profit. In 1926 the Copper Range Co. paid dividends totaling $394,755, compared with $394,727 in 1925.

The Mohawk mine of the Mohawk Mining Co. hoisted 734,879 tons of rock in 1926, stamped 721,066 tons, and obtained 18,340,712 pounds of refined copper, an average yield of 25.435 pounds to the ton stamped. In 1925, 640,069 tons of rock was stamped and 15,819,922 pounds of refined copper produced, an average recovery of 24.716 pounds to the ton. The net profit after depreciation and depletion was $699,600.98, and dividends totaled $575,000.

The Wolverine mine of the Mohawk Mining Co. was idle for the entire year, having been declared practically exhausted by the company in its annual report for 1925.

The mine of the Quincy Mining Co. produced 517,900 tons of copper rock and mass copper, which yielded 13,290,052 pounds of refined copper, 25.66 pounds per ton of rock, the highest average yield obtained by the company for any year during the past 20 years. In 1925, 586,913 tons of copper rock and mass were produced, which yielded 14,357,523 pounds of refined copper, or 24.46 pounds per ton. Operations for the year resulted in a deficit of $171,228.23, partly due to the increased expenditure for new openings, the cost of completing the underground pumping system, and the expenditure covering purchase and partial erection of four Babcock & Wilcox 650-horsepower boilers at the mine to replace two plants that had become obsolete.

MISSOURI

By J. P. Dunlop

PRODUCTION

The value of the mine production of silver, copper, lead, and zinc in Missouri in 1926 was $37,231,560, compared with $39,120,728 in 1925. The value of copper increased $149,062 and that of silver decreased $1,678; the value of lead decreased $3,690,564 and that of zinc increased $1,654,012. The mine production of lead in Missouri in 1926 was equivalent to 30.4 per cent of the smelter production of primary lead from domestic ores in the United States, compared with 32.3 per cent in 1925, and the mine production of zinc in Missouri was 4.3 per cent of the total primary zinc produced by smelters from domestic ores in 1926, as against 2.7 per cent in 1925 and 22.7 per cent in 1917. About 80 mines and prospects in Missouri shipped lead or zinc concentrates in 1926.

Mine production of copper and silver in Missouri, 1917–1926

Year	Copper		Silver		Lead concentrates, silver bearing (short tons)
	Pounds	Value	Fine ounces	Value	
1917	365,013	$99,649	61,586	$50,747	76,222
1918	577,665	142,683	[1] 46,939	46,939	52,000
1919	1,617,200	300,799	[2] 90,401	101,249	81,000
1920	1,512,539	278,307	[3] 111,128	121,130	90,000
1921	137,591	17,749	69,902	69,902	44,000
1922	797,400	107,649	212,656	212,656	138,000
1923	202,556	29,776	177,270	145,361	118,000
1924	182,811	23,948	103,694	69,475	90,000
1925	12,100	1,718	83,340	57,838	89,000
1926	1,077,000	150,780	90,000	56,160	100,000

[1] Includes 7,892 ounces of silver from copper ore or copper concentrates smelted.
[2] Includes 29,480 ounces of silver from cobalt-nickel-copper ore.
[4] Includes 28,664 ounces of silver from cobalt-nickel-copper ore.

The silver content of the lead ores is so small that it is disregarded in the assay and sale of the concentrates. For this reason the smelter reports must be relied on for the silver production. As may be seen by inspection of the table, the quantity of silver produced in any year bears no direct ratio to the quantity of lead concentrates smelted during that year, because the silver content is so small that the silver bullion is stored and refined in batches. Over a series of years the concentrates average more than 1 ounce of silver to the ton.

Most of the copper produced in 1926 was derived from matte recovered in smelting lead ores; 44,000 pounds of the copper came from copper ore from the Sutton mine near Eminence, Shannon County.

The value of the lead and zinc from concentrates produced in Missouri in 1926 was $37,024,620, a decrease of $2,036,552 from the value for 1925. The production of lead concentrates (of which all but 192 tons was galena) was 305,767 tons, as compared with 317,972 tons in 1925. Of the output in 1926, 300,480 tons was derived from southeastern and central Missouri, a decrease of 13,923 tons. The average lead content of the galena concentrates from these districts was 69 per cent in 1926, and the value of the galena concentrates per ton in 1926 was $93.98, as compared with $100.91 in 1925. The lead from southeastern and central Missouri concentrates in 1926 amounted to 203,062 tons, a decrease of 5,853 tons.

Shipments of galena concentrates from southwestern Missouri in 1926 were 5,095 tons, compared with 3,183 tons in 1925. The lead carbonate concentrates amounted to 192 tons, a decrease of 194 tons. The quantity of lead from southwestern Missouri, or the Missouri part of the Joplin region, was 3,950 tons, an increase of 1,299 tons. The average lead content of the galena concentrates from southwestern Missouri was 76.8 per cent, and the average value of the galena concentrates per ton was $105.74, or $4.77 less than in 1925.

The quantity of zinc blende concentrates from Missouri mines in 1926 was 47,473 tons, an increase of 21,286 tons compared with 1925; of the total in 1926, 45,172 tons came from southwestern Missouri.

The average value received was $49.01 a ton, and the average zinc content reported by the sellers of blende concentrates in southwestern Missouri was 59.6 per cent, as compared with $54.18 and 60.8 per cent in 1925.

The zinc carbonate and silicate concentrates sold in 1926 amounted to 3,669 tons, or 1,400 tons more than in 1925. The output came entirely from southwestern Missouri. The average zinc content of these concentrates was 39.3 per cent, and the average value per ton was $31.61, compared with $30.80 in 1925.

The value of lead concentrates from southeastern and central Missouri (which produced about 98 per cent of the total for the State) was $28,239,733, or $3,487,437 less than in 1925. The total value of the lead and zinc concentrates from southwestern Missouri was $2,884,007, compared with $1,873,432 in 1925.

The total quantity of ore or "dirt" mined and treated in Missouri in 1926 was 7,287,100 short tons. As the total amount received for all classes of lead and zinc concentrates sold in 1926 was $31,224,983, the average value per ton of ore or "dirt" mined and treated was $4.28.

In the following tables, showing the tenor of ore ("dirt") and concentrates from Missouri, it has been considered advisable to segregate ores of different nature. The disseminated lead ore of southeastern Missouri differs radically from the lead and zinc ores of the so-called "soft-ground" deposits of southwestern Missouri. Each class of ore has its peculiar problems of mining and ore dressing. The data are given for the ores mined in the Joplin region, but there have been no recoveries from "sheet ground" since 1921. In general, the tables reflect very closely the conditions of the industry.

Mine production of lead and zinc in Missouri in 1926, by districts

District	Lead concentrates				Zinc concentrates			
	Galena		Carbonate		Sphalerite		Silicate and carbonate	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
Aurora, Bryceville, and Wentworth			12	$1,014	4,572	$233,570		
Carl Junction-Carthage					124	5,900		
Duenweg	1,238	$136,180			50	2,300	772	$24,366
Granby	481	48,220			6,186	290,912	1,036	35,183
Joplin	1,595	167,162	147	12,500	6,201	261,409	818	28,346
Oronogo	139	12,090			129	4,047	3	87
Spring City and Seneca	122	13,398	33	1,629	10	400	1,000	27,200
Webb City-Carterville	360	36,494			412	13,302		
Waco	75	7,634			12,027	605,926		
Zincite-Smithfield	1,042	113,185			15,461	796,353		
Dade and Hickory Counties	43	4,400					40	800
	5,095	538,763	192	15,143	45,172	2,214,119	3,669	115,982
Southeastern Missouri	300,480	28,239,733			2,301	101,243		
	305,575	28,778,496	192	15,143	47,473	2,315,362	3,669	115,982
Total, 1925	317,586	32,078,918	386	33,091	26,187	1,418,719	2,269	69,874

[Table continued on next page]

Mine production of lead and zinc in Missouri in 1926, by districts—Continued

District	Metal content[1]			
	Lead		Zinc	
	Short tons	Value	Short tons	Value
Aurora, Bryceville, and Wentworth	7	$1,120	2,397	$359,550
Carl Junction-Carthage	------	------	66	9,900
Duenweg	970	155,200	279	41,850
Granby	347	55,520	3,518	527,700
Joplin	1,230	196,800	3,309	496,350
Oronogo	95	15,200	58	8,700
Spring City and Seneca	113	18,080	340	51,000
Webb City-Carterville	271	43,360	196	29,400
Waco	59	9,440	6,400	960,000
Zincite-Smithfield	824	131,840	8,353	1,252,950
Dade and Hickory Counties	34	5,440	10	1,500
	3,950	632,000	24,926	3,738,900
Southeastern Missouri	203,062	32,489,920	1,092	163,800
	207,012	33,121,920	26,018	3,902,700
Total, 1925	211,566	36,812,484	14,794	2,248,688

[1] In calculating the metal content of the ores from assays allowance has been made for smelting losses of both lead and zinc. In comparing the values of ore and metal it should be borne in mind that the value iven for the ore is that actually received by the producer, whereas the value of the lead and zinc is calculated from the average price for all grades.

Tenor of lead and zinc ore and concentrates produced in southwestern Missouri, 1923–1926

	1923	1924	1925	1926
Total ore short tons	784,000	459,100	662,200	1,025,500
Total concentrates in ore:				
Lead per cent	0.4	0.65	0.54	0.52
Zinc do	4.58	5.38	4.30	4.76
Metal content of ore:				
Lead do	.3	.49	.41	.39
Zinc do	2.65	3.20	2.54	2.77
Average lead content of galena concentrates do	75.6	76.1	76.8	76.8
Average lead content of lead carbonate concentrates do	60.2	60.0	60.0	60.0
Average zinc content of sphalerite concentrates do	60.0	60.7	60.8	59.6
Average zinc content of silicates and carbonates do	38.6	39.3	38.2	39.3
Average value per ton:				
Galena concentrates	$83.40	$101.31	$110.51	$105.74
Lead carbonate concentrates	69.60	78.71	85.73	78.87
Sphalerite concentrates	40.52	41.91	54.18	49.01
Zinc silicates and carbonates	26.57	24.29	30.80	31.61

Tenor of lead ore and concentrates in southeastern Missouri disseminated-lead district, 1923–1926

	1923	1924	1925	1926
Total lead ore short tons	5,314,900	6,059,700	6,209,800	6,261,600
Galena concentrates in ore per cent	4.88	4.83	5.06	4.80
Lead content of ore do	3.21	3.26	3.43	3.32
Average lead content of galena concentrates do	65.9	67.6	67.6	69.0
Average value per ton of galena concentrates	$74.94	$84.55	$100.91	$93.98

Mineral Resources for 1914, Part I, pages 72 to 77 and 97 to 100, gave a brief history of lead and zinc mining in the southeastern Missouri and Joplin regions, also data relating to the total lead and zinc production, the mining and milling practice, the character of the ore and concentrates, and the methods of selling them.

SOUTHWESTERN MISSOURI

AREA AND PRODUCTION

The southwestern Missouri lead and zinc areas include the largest part of the Joplin region, the remainder lying in southeastern Kansas and northeastern Oklahoma.

Lead and zinc concentrates produced in the Missouri part of the Joplin region, 1907–1926

	Short tons	Value	
		Total	Average
Lead concentrates	455, 733	$29, 409, 791	$64. 53
Sphalerite concentrates	2, 870, 232	146, 130, 679	50. 91
Zinc carbonate and silicate concentrates	302, 446	9, 359, 963	30. 95
	3, 628, 411	184, 900, 433	----------

PRICES

The following quoted base prices apply not only to southwestern Missouri, but also to all the mines in Oklahoma and Kansas that are in the Joplin region. The average quoted base prices for 60 per cent sphalerite were highest during January, 1926.

The quoted price was $56 early in January but slumped as low as $53 at the end of the month. February brought a lower market, and prices declined, first to $50 and then to $49. The March prices were $47 to $49. In April the price was stable at $47; in May it was $45; in the last two weeks of June it stiffened to $48 and in July reached $50. In August and September prices were $49 to $50. In October $48 and $49 were quoted and paid. In November the market was lower and steady at $47. Lower prices prevailed in December, and $46 was the closing quotation.

No base prices were quoted for calamine or zinc silicate in 1926, and there was little demand for these ores. The output increased slightly in 1926 and was mainly sold in small lots. Nearly all was from lessees on Granby land milled at the American mill and at mills near Joplin, including Buxton and Durfee. If more zinc silicate was produced, it would be in more active demand. Carload lots are desired, and it is not easy to sell chunk zinc silicate. There were more inquiries for zinc silicate late in the year, but buyers did not offer a high enough bid to induce active operation of small mines.

The quoted price for galena carrying 80 per cent of lead showed wide variations, from a high of $120 a ton during the last two weeks in January to a low of $87.50 in May. The price of galena was unsteady at $115 to $120 a ton during January. It declined to $115 a ton in February and to $100 a ton in March. April prices were still lower at $92.50 to $90. In June galena advanced to $100, and in July the price advanced weekly to as high at $112.50, which was the price all of August. The price declined to $110 the latter part of September. The market weakened in October, opening the first week at $112.50, and the last week's quotation was $100, which remained the quoted price until the last week in December, when there was a further decline to $97.50.

The following prices are not averages of base-price quotations but averages calculated from the quantity sold and the amounts received as reported by the sellers.

Average prices per ton paid for sphalerite and zinc and lead concentrates in southwestern Missouri, 1918–1926

	1918	1919	1920	1921	1922	1923	1924	1925	1926
Sphalerite	$51.27	$40.67	$45.79	$25.18	$31.91	$40.52	$41.91	$54.18	$49.01
Zinc silicate or carbonate concentrates	32.27	27.30	35.50	10.57	21.25	26.57	24.29	30.80	31.61
Galena concentrates	89.92	66.82	97.84	50.15	69.44	83.40	101.31	110.51	105.74

GENERAL CONDITIONS

Some new properties were worked, but the output from the Missouri part of the Waco district decreased. In southwestern Missouri there was an increase of 1,912 tons of galena, 18,985 tons of sphalerite, and 1,400 tons of zinc silicate and carbonate. A steady drilling campaign was conducted in many of the old camps and in new undeveloped territory, especially by the Kansas Exploration Co., St. Louis Smelting & Refining Co., Victor Rakowsky, Federal Mining & Smelting Co., Admiralty Zinc Co., and Grasselli Mining Corporation. Some drilling was done at Granby, Smithfield, Waco, Thoms Station, Spring City, Joplin, and other districts, and some bodies of ore are reported found, though none has so far yielded any output comparable with mines in Oklahoma and Kansas.

Leasing was active, and many of the larger operators purchased fees on land that they desired to drill and hold for future operations, especially in sheet ground which does not yield enough ore for profitable mining at present prices. Several new mills began work; others were being constructed and will be running in 1927. The output from southwestern Missouri will not increase much in 1927, even if the present price for ore continues. Mines near Smithfield and along the Kansas-Missouri State line yielded about one-third of the output of blende for Missouri in 1926.

The Missouri part of the Waco district produced only 25 per cent of the sphalerite shipped from Missouri in 1926, against 47 per cent in 1925 and 90 per cent in 1924. The mines at Waco, in Missouri only, that contributed the 12,027 tons of sphalerite and 75 tons of galena were those of the Barnsdall Zinc Mining Co. (No. 2), American Zinc, Lead & Smelting Co., Universal Exploration Co., Tulsa Pittsburg Mining Co., and the Lihme Zinc Co. The Freehold No. 4 was taken over by the St. Louis Smelting & Refining Co. but made no output, though a shaft was sunk. The Universal was active all year but was shut down early in 1927. The Lihme group of mines, together with the Tulsa Pittsburg and other leases, were sold to the Tri State

Zinc Co., which is running a large number of drills on the property. The Barnsdall mines in Missouri have been sold to the Missouri-Kansas Zinc Corporation, which also purchased the Butte-Kansas and Acme mines on the Kansas side of the Waco camp.

At Wentworth the Barbo Mining Co. made steady shipment of lead-free sphalerite from its 200-ton mill and was rebuilding the mill on an adjoining lease. The Eagle-Picher Lead Co. continued drilling and drifting at the Navy Bean mine. Only scrapping and drilling were done in the old Webb City-Carterville and Oronogo camps, and a few carloads of sphalerite and galena concentrates were shipped. The Rogers Mining Co. mill south of Carthage operated only a few weeks before it was burned. The Fisher lease east of Carthage was drilled, an old shaft unwatered, and some drifts run. This lease is not yet equipped with a mill. In the Spurgeon-Spring City camps the production was scattered and small. The Eagle Picher Mining Co. worked the Velton mine near Bryceville, Barry County, during a large part of the year but finally closed down the mine late in 1926. Considerable drilling was done on the Russell land in Dade County, and a shaft was sunk in 1926. A 200-ton mill being erected was completed in April, 1927.

At Duenweg the only producers of any importance were the Log Cabin Mining Co., the largest shipper of galena in 1926 and a producer of galena concentrates only, and the Joalmo Mining Co., which produced small quantities of blende, galena, and zinc silicate. A considerable number of small leases on the Granby land of the American Zinc, Lead & Smelting Co. at Granby yielded lead and zinc concentrates. The Federal Mining & Smelting Co., a large lessee of the Granby land, operated the 400-ton concentrating plant and was the second largest shipper of sphalerite from Missouri in 1926. This plant, one of the best in Missouri, is supplied with ore from different levels of the old Klondike, Mascot, and other mines.

Only a few mines were active near Joplin in 1926, and a large part of the galena and zinc silicate was produced in small lots by miners working in old areas. The largest output of sphalerite in Missouri was that of the Isherwood mine of the Kansas Exploration Co., which operated five shafts at levels about 140 feet deep. The mill has a capacity of 250 tons in 10 hours. The C. & S. Mining Co. (old Imperial) operated two shafts and a 200-ton mill near the Kansas-Missouri State line which yielded good outputs of both lead and zinc. Two shafts 160 feet deep were used to hoist ore, and many improvements were made in the equipment. Other producers near Joplin in 1926 were the Riverside Mining Co. (250-ton mill), near Fillmore's bridge, and the Missouri Mining Co., on American Zinc, Lead & Smelting Co. land. The Buxton-Durfee mill at Joplin ran part time on purchased ore and concentrates, and the Clark Concentrating Co. at intervals continued to re-treat old slag at the Eagle-Picher Lead Co. dump. The H & C C Mining Co. 250-ton mill on the Underwood land was run for a few months.

At the Black Cat mine near Smithfield drilling and development were done, a shaft was sunk, the 150-ton mill was finished, and a large output of high-grade blende was made in 1926. On the Alamo land at Thoms Station the Admiralty Zinc Co. 200-ton mill ran part of 1926, but was moved in the fall to Smithfield and rebuilt. The mill of the Grasselli Mining Corporation near Thoms Station, on Mexico-Joplin land, was run most of the year and made a fairly large output of lead and zinc. The Matthiessen & Hegeler Mining Co. mill was operated on the old Napoleon lease for a few weeks in 1926 and then shut down to await better prices. The only output from Hickory County was a few tons of galena sold by J. G. Westerman, of Weaubleau, and the only shipment from Dade County was some zinc silicate taken out during development of the Johnson land.

CENTRAL AND SOUTHEASTERN MISSOURI

A brief description of the ore deposits in central and southeastern Missouri is given in the chapter of this series for 1915.

Copper, nickel, and cobalt occur in the ore in considerable quantity near Fredericktown and in small quantity irregularly in nearly all deep mines. It is only near Fredericktown that the copper, nickel, and cobalt content of the ore has been the object of mining, yet a concentrate of these metals has been recovered as a table middling at several plants in other parts of the district.

In the disseminated-ore district the production increased rapidly after 1869 and is estimated by Buckley to have amounted to 1,202,607 tons of lead concentrates, valued at $59,869,354, for the period from 1869 to 1906, inclusive. The mine production of southeastern and central Missouri has been reported annually since 1907.

Mine production of lead and zinc concentrates in southeastern and central Missouri, 1917–1926

Year	Lead concentrates (galena)		Zinc concentrates			
			Sphalerite		Carbonate and silicate	
	Short tons	Value	Short tons	Value	Short tons	Value
1917	306,473	$30,070,995	186	$16,344	293	$7,145
1918	271,506	20,507,064	13	285	235	6,845
1919	229,687	11,590,977			231	6,576
1920	242,248	19,799,389			61	1,910
1921	280,358	11,737,400				
1922	271,294	14,779,869				
1923	259,320	19,434,633				
1924	292,604	24,739,819				
1925	314,403	31,727,170				
1926	300,480	28,239,733	2,301	101,243		

The output of silver in Missouri in 1926 was derived from refining pig lead or from copper matte or zinc concentrates recovered in milling or smelting lead ores.

The lead ore mined in the disseminated-lead district in 1926, amounting to 6,261,600 short tons, yielded 4.80 per cent of lead concentrates which averaged 69 per cent of lead. The average value per ton of lead concentrates was $93.98, compared with $100.91 in 1925. The output of galena concentrates was 300,400 tons, against 314,276 tons in 1925. As several of the large producers not only mine but also smelt their lead concentrates, the values given for concentrates are to a certain extent arbitrary. The galena concentrates produced in the southwestern Missouri region, which contain a higher lead content, are sold mainly on bids from purchasers, and the values for those concentrates are not comparable with values given for concentrates of the disseminated-lead district.

Analyses of ores mined in the disseminated-lead district in southeastern Missouri and of the various grades of resulting concentrates are given in Mineral Resources for 1919 and 1920.

There were no shipments of zinc carbonate from southeastern Missouri during 1926, but a flotation plant was built by the St. Joseph Lead Co. which treated old zinc middlings recovered from lead ore. The concentrates shipped averaged 53.9 per cent zinc and yielded considerable silver.

The quantity of galena recovered from shallow diggings in Washington and Jefferson Counties was only 80 tons. The ore, which occurs at shallow depths in association with barite, is mined in a small way and at odd times by the barite miners.

Considerable drilling was done by Rakowsky and Naething in southeastern Missouri. Nixon-Thompson have a large area of land under lease near Lynn Creek on which a number of shallow shafts were sunk. The ore mined was placed on the dump; none was sold in 1926.

Small sales of lead ore were made by T. F. Blount, of Fertile, and the Washington Land & Mining Co. Nearly all the lead produced in southeastern Missouri was mined by the National Lead Co., St. Joseph Lead Co., Desloge Consolidated Lead Co., and Annapolis Lead Co.

The only copper ore shipped in 1926 was from the Sutton mine, near Eminence in Shannon County, leased by A. Larkin, which was operated 90 days in 1926. A carload of copper ore was shipped, a 100-foot shaft sunk, and there is considerable ore on the dump. Nearly all the copper output of Missouri in 1926 was from the treatment of slags derived from the smelting of lead ores.

In 1926 the St. Joseph Lead Co., from mines in southeastern Missouri, produced about 4,629,100 tons of ore, which yielded 231,381 tons of lead concentrates, and the smelter produced about 161,000 tons of pig lead. The St. Joseph Lead Co. now has five concentrating plants: Rivermines, 4,200 tons; Bonne Terre, 2,400; Leadwood, 2,000; Flat River, 5,000; and Elvins, 3,000. Other concentrating plants are those of the National Lead Co., 2,500 tons, and the Desloge Consolidated Lead Co., 1,600 tons. Besides operating in southeastern Missouri, the St. Joseph Lead Co., through a subsidiary, has done a large amount of drilling in the Joplin region and operated four plants.

The Desloge Consolidated Lead Co. remodeled the concentrating plant and operated three shafts in 1926. S. C. Wilson et al. were developing a copper prospect and constructing a leaching plant on the north half of sec. 36, T. 28, R. 4, in Shannon County.

The Annapolis Lead Co. mine in Iron County was worked through the 450-foot shaft for about 60 days after the milling plant had been rebuilt.

OKLAHOMA

By J. P. Dunlop

Mine production of lead and zinc in Oklahoma in 1926, by districts

District	Lead concentrates (galena)		Zinc concentrates (sphalerite)		Metal content [1]			
					Lead		Zinc	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
Miami	85,244	$9,108,484	495,116	$22,670,836	65,473	$10,475,680	253,897	$38,084,550
Peoria	28	2,110	[2] 82	2,065	21	3,360	26	3,900
Quapaw and Sunnyside	5,353	581,575	36,497	1,733,263	4,210	673,600	18,644	2,796,600
	90,625	9,692,169	531,695	24,406,164	69,704	11,152,640	272,567	40,885,050
Total, 1925	103,359	12,106,094	549,211	27,809,581	79,946	13,910,604	283,371	43,072,392

[1] In calculating the metal content of the ores from assays allowance has been made for smelting losses of both lead and zinc. In comparing the values of ore and metal it should be borne in mind that the value given for the ore is that actually received by the producer, whereas the value of the lead and zinc is calculated from the average price for all grades.

[2] Concentrates shipped were zinc silicate containing 29 per cent zinc.

The following table gives the output of lead and zinc ore for the whole State of Oklahoma:

Tenor of lead and zinc ore and concentrates produced in Oklahoma, 1923–1926

	1923	1924	1925	1926
Total ore milled in Oklahoma ... short tons	7,937,200	8,804,000	10,605,200	10,934,000
Total concentrates in ore:				
Lead ... per cent	1.08	1.04	1.01	0.86
Zinc ... do	5.61	5.76	5.13	4.95
Metal content of ore:				
Lead ... do	.86	.83	.80	.65
Zinc ... do	3.34	3.41	3.01	2.83
Average lead content of galena concentrates ... do	79.9	79.2	78.9	78.5
Average zinc content of sphalerite concentrates ... do	59.5	59.2	58.6	58.1
Average value per ton:				
Galena concentrates	$94.95	$106.68	$117.13	$106.95
Sphalerite concentrates	40.45	40.93	50.64	45.91

Included in the ore milled in 1926 are 960,600 tons of old tailings which yielded 29 tons of galena concentrates and 17,421 tons of blende concentrates averaging 55.2 per cent zinc.

Mine production of lead and zinc concentrates in Oklahoma, 1891–1926, by districts

District	Lead concentrates (mainly galena)		Zinc concentrates			
			Sphalerite		Zinc silicate and carbonate	
	Short tons	Value	Short tons	Value	Short tons	Value
Peoria	2,206	$109,163	220	$8,289	2,924	$76,467
Quapaw and Sunnyside	13,304	1,279,339	105,324	4,870,559	164	2,692
Miami	802,902	72,585,536	3,982,734	174,631,449		
Davis			558	27,399	899	24,592
	818,412	73,974,038	4,088,836	179,537,696	3,987	103,751

Mineral Resources for 1914 contains a brief history of mining in the districts in Oklahoma and also the estimated total production of each district, by years.

The total quantity of lead and zinc concentrates shipped from Oklahoma in 1926 was 5 per cent less than in 1925, but the value was $5,817,342 (or 15 per cent) less. The total value of the zinc was 5 per cent less than in 1925 but greater than the value of any one year's production of any other State.

The lead and zinc deposits of northeastern Oklahoma, so far as known, are confined to Ottawa County and form the southwestern extension of the deposits in the Joplin region. There are three camps—Peoria, Quapaw-Sunnyside, and Miami—in which extensive mining has been done, and a fourth, the Sycamore Creek district, along the Seneca fault block 2 to 3 miles southwest of Seneca, Mo., in which considerable prospecting has been done and some ore mined. The lead and zinc deposits in southern Oklahoma are near Ravia, at the southeast end of the Arbuckle Mountains, and near Davis, Murray County, at the northwest end of the same range.

The quantity of ore and tailings milled in Oklahoma increased 328,800 tons in 1926, of which the total quantity milled by the old mines near Commerce and for mines near Quapaw and Sunnyside was about 7 per cent, against 3 per cent in 1925. The value of the lead and zinc produced at mines in Oklahoma in 1926 was $52,037,690, compared with $56,982,996 in 1925. The lead from concentrates sold decreased from 79,946 to 69,704 tons and the zinc from 283,371 to 272,567 tons.

The average lead content of the concentrates produced decreased from 78.9 per cent in 1925 to 78.5 per cent in 1926. The average metal content of the sphalerite concentrates from the Miami ore increased from 51.8 per cent in 1912 to 58.6 per cent in 1925 and decreased to 58.1 per cent in 1926. The greatly increased quantity of concentrates made from tailings and the general use of flotation in treating slimes accounts for the decrease in the average grade of the concentrates.

Oklahoma produced about 68.3 per cent of the total output of lead concentrates from the Joplin region. The Oklahoma shipments of sphalerite decreased 17,598 tons and formed 65 per cent of the output of sphalerite from the Joplin region.

A history of the mining in the Miami district, including the output by years for 1908 to 1914 and the location of the mines and mills, was given in Mineral Resources for 1914. The reports for 1915 to 1925 contain full reviews of the production, new territory prospected, new mines opened, and new mills erected in those years. A brief description of the ore deposits in the Miami district is given in Mineral Resources for 1915.[5]

In 1926 about 143 mills in the Oklahoma part of the Miami field shipped 90,625 short tons of galena concentrates and 531,613 tons of sphalerite concentrates. The average value of the galena concentrates decreased $10.18 a ton, and the average value of sphalerite concentrates, of which the quantity was nearly six times as great as that of galena shipped, decreased $4.73 a ton.

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[5] Siebenthal, C. E., Zinc: Mineral Resources, 1915, pt. 1, 1917, pp. 888–890.

The striking feature in the Miami district in 1926 was the rapid increase in the installation of flotation plants which are now used in nearly all mills in the district. More attention also was given to milling, and consequently the percentage of recovery from ore was greater. It is estimated that between 80 and 85 per cent of the metal is now being recovered. A few plants utilized ball mills or rod mills for the first time for regrinding in the district.

Some drilling was done on the western edge of the productive area, and several new mines were ready for mills. The weekly output grew steadily in 1926, when it reached about 20,000 tons of concentrates. There were no labor troubles, and the supply of labor was ample but not in excess of demand. In all, the Joplin region enjoyed one of its most prosperous years; its output sold at good prices, and most operators made satisfactory profits even if the recovery of concentrates from ore averaged considerably less than in 1925 and prices were appreciably lower.

The total quantity of ore and tailings milled in the Miami region in Oklahoma and Kansas in 1926 was about 14,956,300 tons. Each of 135 mines in this region made shipments of lead and zinc concentrates exceeding $100,000 in average value. There were more drill rigs and more shafts and milling plants in operation in this small area than in any other district in the United States. Comparatively few new mills were built, but recoveries of concentration were greatly increased by better mill equipment, more tables, and the general adoption of flotation for slimes. There are now about 140 flotation plants in the field. The quantity of flotation concentrates being produced at the end of the year was about 2,200 tons weekly. Use of selective flotation is gradually increasing, and some galena concentrates from flotation plants contain 80 per cent lead; the sphalerite contains 58 to 60 per cent zinc, though some runs as low as 48, and the average is probably less than 55 per cent. The use of filters has increased, and the moisture in the flotation concentrates is now much less than formerly, though there is room for much improvement both in the grade and in the moisture content of blende concentrates.

About 960,600 tons of tailings were re-treated in 1926, yielding mainly zinc concentrates of which the average zinc content was 55.2 per cent. The tailings yielded only 29 tons of galena, as very little galena is lost in milling the original ore. Many tailing plants were built late in 1926, and a number of mills handling ore in previous years are now treating tailings or part ore and part tailings; hence it is probable that the recovery from tailings in 1927 will be 50,000 to 60,000 tons of zinc concentrates. The increase in lead concentrates from tailings will be merely nominal.

Few mines were abandoned during the year, though many were thought to have nearly exhausted their ore bodies. By active prospecting most of the old properties found more ore or took up old stopes and discovered ore at lower levels. There will, however, be a steady increase in the number of worked-out mines in 1927 and 1928. Considerable ore was mined that yielded less than 4 per cent in concentrates; most of this ore, however, contained more than the usual proportion of lead and produced lead concentrates that were more than double the value of zinc concentrates produced.

The large companies continued to expand their holdings and operations, and the price of developed mines and working mills remained high. Most of the mines or leases sold in 1926 were taken by operators of other mines in the district. Virtually all of the larger operating companies, such as the Federal, Eagle-Picher, Kansas Exploration, Golden Rod, Commerce, New Chicago, Consolidated, Vinegar Hill, Velie, American Zinc, Anna Beaver, and Admiralty, increased their holdings.

Near Hockerville and Zincville.—The Farmington and Lucky Jack mines were transferred from the Federal Mining & Smelting Co. to J. R. Cole et al. late in 1926, and the Ozark Lead & Zinc Co. built a tailing mill on the Farmington lease. A new mill was built by the Golden Rod Mining & Smelting Co. on the Weiss lease after the Hope mill, which it had purchased, was burned before being put in operation. No output was made in 1926. The Brewster mine was again the largest producer in this area; the output of the Indiana, Kropp, Black Eagle, and Huttig was less than in 1925. Large outputs were made at the Scott and the Beck mills, though no lead was shipped from the Beck. Huttig mill No. 2 on the Beck lease started in December. On Huttig No. 1 a tailing plant, built by T. J. Rightly, treated sands and slimes in 1926. The Lucky Jenny mine was operated under an option to purchase by Kansas Exploration Co. for three months and was afterwards leased to the Tri State Zinc Co.

The largest producing mines in this area were the Brewster, Huttig No. 1, Dobson, Meteor, Consolidated Nos. 2 and 3, Kropp, Imbau, Beck, Mary Ann, Scott, Santa Fe, and Texas. Smaller producing mines were the Black Eagle, Huttig No. 2 (Beck lease), Blue Bonnett (tailings), Theurer (tailings), Retriever (tailings), Ozark (tailings), Blue Ribbon, Lucky Jenny, Indiana, and Farmington.

Near Quapaw and Sunnyside.—About 729,600 tons of ore and tailings were milled in 1926, and the shipments derived therefrom were 5,353 tons of galena and 36,497 tons of blende. More than half of the galena and one-fourth of the blende was shipped from the Malsbury mine, and five mines yielded blende with no appreciable quantity of lead.

The largest producing mines in 1926 were the Malsbury, Tulsa, Patty C, Donna Jane, Rainbow, and Davenport. Some of the other producers were the Hope, Bingham, Martha B, Gish, Mary Jane, Eleventh Hour, Hobart, America Prospecting, Vantage No. 2, and Commonwealth No. 3.

The Kaw Mining Co. erected a 100-ton mill in 1926, but it was in operation only a few weeks. The Rainbow mill was rebuilt and now has a capacity of 30 tons an hour. The Century Zinc Co. completed a 300-ton mill on the Bingham lease in October, 1926, and sunk two shafts to the 240-foot level. The Martha B mine had a large output of lead from the 130-foot level. Rialto No. 2 ran only a few months and was sold to the Gish Mining Co. The Mary Jane mine was worked three months by T. F. Coyne and three months by the S. R. & W. Mining Co., after which it was sold to W. M. Smith, who prospected with drills the last part of the year. The Patty C mine was operated for eight months by the owners and the remainder of 1926 by the United Zinc Smelting Co. under an option to purchase. The option was not exercised and the property reverted to the owners.

The Davenport mill (400 tons) was rebuilt by the Federal Mining & Smelting Co., and a rod mill and flotation equipment were installed. Vantage No. 2 was operated for three months by the U. S. Zinc Smelting Co. and then sold to the Century Zinc Co.

Near Century and Douthat.—Seventy per cent of the sphalerite and 80 per cent of the galena shipped from properties in this area were produced by the Consolidated Lead & Zinc Co. (two mills), New Chicago Mines Corporation (two mills), Admiralty Zinc Co. (three mills), and Skelton Lead & Zinc Co. (three mills). Other producing mines were Pat Mining Co., Gish Mining Co. (old Missouri Mule), Ramage Mining Co., Advance Mining Co. (old Federal), Childress Lead & Zinc Co., Birthday Mining Co., Van Buren Mining Co., Golden Rod No. 23, and Remnants (Inc.) (Quebec mine). Tailing mills active in 1926 were those of Tri State Development Co. (Skelton No. 8), Dudley Milling Co. (Admiralty lease), Century Milling Co. (Montreal lease), California Milling Co., and Moyer Milling Co. The only new milling plants built in this area in 1926 were the Moyer and the Buxton, both of which were for the re-treatment of sand and tailings. The Skelton Lead & Zinc Co. was the largest shipper of blende concentrates and the New Chicago Mines Corporation of galena concentrates. The Missouri Mule mine was purchased by the Gish Mining Co. and the old Mogul mine by the Van Buren Mining Co.

Near Cardin and Tar River.—This area in the Miami field had the largest number of operated mines and made much the largest shipments of concentrates in 1926. The heaviest shippers were the Golden Rod Mining & Smelting Co. (five mills), Commerce Mining & Royalty Co. (seven mills), Bilharz Mining Co. (two mills), Oklahoma Woodchuck Zinc Lead Co. (one mill), Velie Mine Corporation (one mill), Anna Beaver Mine Co. (two mills), Rialto Mining Corporation (one mill), and Domado Lead & Zinc Co. (two mills).

Other large producers of lead and zinc were Crystal Mineral Trust, Consolidated Lead & Zinc Co. (No. 13), Pioneer Mining Co., Federal Mining & Smelting Co. (Lucky Bill), L. & G. Mining Co. (Republic), Harrisburg Mining Co., Vinegar Hill Zinc Co. (Wilson), Barnsdall Zinc Co. (Goodeagle), Quapaw Mining Corporation (Tom L.), Kitty Mining & Milling Co., Childress Lead & Zinc Co. (Southside), Laclede Lead & Zinc Co., and Foch Mining Co. Anna Beaver No. 2 mill on the Adams lease was finished and operated late in 1926. It was the first all steel-and-concrete mill completed in the Joplin region and has a capacity of 500 tons (10 hours). A small sludge plant was erected to treat the sand at the old Kitty mine. The R. T. & R. Milling Co. plant at the old Standard mine was burned in February, 1927.

Near Picher.—From the area about Picher, which includes many of the older mines of the Miami district, the output of concentrates in 1926 was considerably less than in 1925, as the recovery from ore milled was smaller. The largest shipper was the Eagle-Picher Lead Co. (eight mills). Other large shippers were the Acme Lead & Zinc Co., Dorothy Bill Mining Co. (two mills), United Zinc Smelting Corporation (Royal), White Mines Co., Mahutske Mining Co., Lucky Kid Mining Co. (Whitebird, Keltner, and Beck leases), Commerce Mining & Royalty Co. (Grace Walker), Premier Zinc Co. (Premier and St. Joe), Federal Mining & Smelting Co. (two mills), Consolidated Lead & Zinc Co. (La Salle, Piokee, and Grace B No. 2), Vantage Mining Co., Birthday Mining Co. (Leonora), Howe Mining Co., Commonwealth Mining Co., St. Louis Smelting & Refining Co. (American Beauty), Oko Mine, Golden Rod Mining & Smelting Co. (Jefferson), Black Hawk Lead & Zinc Co., Cortez King Brand Mining Co. (New York), and the Jeff City Mining Co. The Dorothy Bill Mining Co. ceased operations late in 1926, and its No. 2 plant was sold to the Eagle-Picher Lead Co., while No. 1 plant was acquired by the Canadian Mining & Development Co. and converted into a tailing mill. The ore body at the Premier and St. Joe mines was exhausted in 1926, and the leases were sold to the New Chicago Mines Corporation, which converted the Premier mill into a tailing plant capable of treating 1,000 tons in 24 hours. The Moyer Milling Co. built a plant to treat sludge at the New York mine and the Just Right Milling Co. a flotation plant to treat sand and tailings at the Acme mine.

The quantity of ore and tailings milled in Oklahoma increased from 10,605,200 tons in 1925 to 10,934,000 tons in 1926. The average zinc content of the sphalerite was 51.8 per cent in 1912, 58.8 per cent in 1919, 59.2 per cent in 1924, 58.6 per cent in 1925, and 58.1 per cent in 1926. The separate assays reported in 1926 showed a zinc content of 45 to 62 per cent, but most of the blende assayed between 57 and 60 per cent. An assay of a composite sample of 10,153 samples of ore shipped in 1926 from the Miami-Blue Mound region, made by Bruce Williams, of Joplin, Mo., showed an average content of 58 per cent of zinc, 2 per cent of iron, 1.35 per cent of lead, and 0.45 per cent of cadmium. An assay of a composite sample of blende from 3,164 lots shipped in 1926, made by Joe J. Todd, of Miami, Okla., showed 58.50 per cent of zinc and 1.40 per cent of iron. An assay by Mr. Todd of a composite sample of galena from 486 lots showed 77.60 per cent of lead. The average zinc assay as computed from the reports of all the companies selling concentrates was 58.1 per cent.

The recovery of concentrates from all the mines in Oklahoma averaged about 1 ton of galena to 5.9 tons of sphalerite. The proportion of galena concentrates recovered from the "dirt" mined showed wide variations in different mines, ranging from less than 1 ton of galena to 50 tons of sphalerite to 4 tons of galena to 1 ton of sphalerite. Only six mines reported the recovery of no lead.

The total shipments from those properties that may be properly classed as in the Tar River-Cardin-Douthat area, of which there were a greater number than in the other areas, amounted to 47,333 tons of galena and 285,978 tons of sphalerite, a combined total of concentrates about equal to that of 1925, although the percentage of concentrates recovered decreased from 6.29 to 5.74 per cent.

About 5,806,800 tons of "dirt" was milled, and the recovery in concentrates averaged about 0.81 per cent for galena and 4.93 per cent for sphalerite. A few of the mines near Cardin yielded about half as much galena as sphalerite, and in a few mines near Douthat the proportion of galena was as little as 3 per cent. On the whole the proportion of galena to sphalerite was less than that recovered from the mines near Picher but much more than that from the mines near Hockerville and Zincville. The proportion of galena to sphalerite recovered at all the mines in the vicinity of Douthat was about 1 ton of galena to 8 tons of sphalerite; in the Tar River section the mines yielded about 1 ton of galena to 5.35 tons of sphalerite.

The territory east of Picher, near the Hockerville and Zincville (St. Louis) camps, was less productive than in 1925 when the shipments from 24 mines were 13,605 tons of galena and 103,627 tons of sphalerite; in 1926 the shipments from 24 mines and 4 tailing mills were 9,150 tons of galena and 88,088 tons of sphalerite, from 1,400,000 tons of ore and 231,000 tons of tailings treated. The sphalerite averaged about 57.5 per cent in zinc content and the galena 78.1 per cent in lead content. The decrease in output was due to exhaustion of much of the rich ore in the Huttig, Texas, Kropp, Consolidated Nos. 2 and 3, Santa Fe, Imbau, and Farmington mines.

The production of the mines near Picher decreased. In 1925 the quantity of ore milled was 3,406,400 tons, and the shipments were 32,481 tons of galena and 143,746 tons of sphalerite. In 1926 the quantity of ore and tailings milled was 2,870,400 tons, and the shipments were 28,264 tons of galena and 117,823 tons of sphalerite, or an average recovery of 5.09 per cent in concentrates. The zinc content of the sphalerite averaged about 58.1 per cent and the lead content of the galena 77.6 per cent. Of the material milled in 1926, about 147,300 tons was tailings, which yielded 2,156 tons of blende concentrates and a few tons of galena concentrates.

At Commerce several old mines, including the Gordon McBee worked by the Commerce Mining & Royalty Co., the Lost Trail, the Cactus and Prairie, and the Emma Gordon (leased to the Incas Mining Co.), were operated in 1926. Shipments from Commerce were 497 tons of galena and 3,227 tons of sphalerite. The shipments of galena in 1926 were only about one-half of the quantity produced by the mills, for most of the output of lead was not sold in 1926.

The only shipments from Peoria, the oldest mining camp in Oklahoma, reported in 1926 were small lots of galena and zinc silicate purchased by the Eagle-Picher Lead Co.

Some of the mills to which flotation plants were added in 1926 are as follows: Bingham, Just Right, Pioneer, Foch, Canadian, Adams, Ozark, White, Goodwin, Hunt, Big Chief, Consolidated Nos. 2, 3, 8, and 9, Indiana, Retriever, Huttig Nos. 1 and 2, Crane, Van Buren, Ramage, Admiralty Nos. 2 and 3, Premier, and Moyer.

WISCONSIN

By J. P. Dunlop

Mine production of lead and zinc in Wisconsin in 1926, by districts

District	Lead concentrates		Zinc concentrates				Metal content [1]			
			Sphalerite		Silicate and carbonate		Lead		Zinc	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
Benton-New Diggings	768	$68,024	37,457	$888,477			493	$78,880	10,091	$1,513,650
Cuba City	293	30,347	2,891	58,482			193	30,880	860	129,000
Dodgeville	185	16,576	1,328	40,589	23	$395	130	20,800	457	68,550
Hazel Green	86	8,699	13,939	317,411			64	10,240	3,588	538,200
Highland	24	2,400	608	15,600	572	14,510	16	2,560	387	58,050
Linden and Livingston	228	22,246	6,588	154,940			164	26,240	1,747	262,050
Platteville	128	13,700	6,200	148,000			94	15,040	1,708	256,200
Shullsburg	635	56,321	31,687	580,813			392	62,720	7,962	1,194,300
	2,347	218,313	100,698	2,204,312	595	14,905	1,546	247,360	26,800	4,020,000
Total, 1925	2,628	277,580	76,463	1,732,448	754	16,974	1,877	326,598	20,230	3,074,960

[1] In calculating the metal content of the ores from assays allowance has been made for roasting and smelting losses of both lead and zinc. In comparing the values of ore and metal it should be borne in mind that the value given for the ore is that actually received by the producer, whereas the value of the lead and zinc is calculated from the average price for all grades.

Tenor of lead and zinc ore and concentrates produced in Wisconsin, 1923–1926

	1923	1924	1925	1926
Total ore — short tons	454,000	652,000	1,003,700	1,440,300
Total concentrates in ore:				
Lead — per cent	0.22	0.27	0.26	0.16
Zinc — do	9.10	8.49	7.62	7.03
Metal content of ore:				
Lead — do	.17	.20	.19	.13
Zinc — do	3.17	2.77	2.53	2.38
Average lead content of galena concentrates — do	76.6	73.1	72.8	67.2
Average zinc content of sphalerite concentrates — do	35.2	32.6	32.8	33.8
Average zinc content of zinc carbonate concentrates — do	33.1	33.4	34.1	32.3
Average value per ton:				
Galena concentrates	$82.64	$100.11	$105.62	$93.02
Sphalerite concentrates	18.69	17.59	22.66	21.89
Zinc carbonate concentrates	17.56	17.25	22.51	25.05

The ore yields from 5 to more than 20 per cent of concentrates. The average recovery in concentrates decreased from 7.88 per cent in 1925 to 7.19 per cent in 1926. The decrease reflected the increase in the quantity of ore milled.

The zinc carbonate ore, which is mined almost entirely in the Highland and Mineral Point districts, is purchased by the Mineral Point Zinc Co. and made into zinc oxide in the plant at Mineral Point, Wis. Less carbonate ores were produced, and the sales in 1926 were 595 tons, or 159 tons less than in 1925.

The metal content of the raw sphalerite concentrates shipped by the mines ranged from 21 to 55 per cent, but more than 80 per cent of the concentrates sold ranged between 30 and 37 per cent. The zinc content of the roasted sphalerite concentrates shipped was 57 to 58.2 per cent.

The value of the mine output of lead and zinc in Wisconsin in 1926 was $4,267,360, compared with $3,401,558 in 1925. The lead concentrates sold decreased from 2,628 tons in 1925 to 2,347 tons in 1926, and the sphalerite concentrates sold increased from 76,463 tons to 100,698 tons. The quantity of lead from galena concentrates was 331 tons less than in 1925. The zinc from sphalerite and zinc carbonate concentrates increased 6,570 tons.

More development work was done than in 1925, and a few new mines were opened. Several old properties were unwatered and worked. The largest producer among the new mines was the High Spot mine on the Roseleep land near Platteville. The shaft is 186 feet deep, and the mill has a capacity of about 250 tons.

About 66 per cent of the galena and 84 per cent of the sphalerite shipped were the output of the Vinegar Hill Zinc Co. and the Mineral Point Zinc Co., although about 24 mills were operated. Small quantities of galena and zinc carbonate were produced by many small operators.

The lead and zinc mines of Wisconsin are in Grant, Iowa, and Lafayette Counties and contain the most valuable part of the ore deposits of the upper Mississippi Valley region, a historical review of which is given in the Illinois section of this report in Mineral Resources for 1914. A detailed description of the Wisconsin lead and zinc districts and of the mines in each district to the year 1906 is given by Bain.[6] The development of the mines subsequent to Bain's report and the output of Wisconsin mines have been set forth in Mineral Resources since 1906.

Roasting and electromagnetic separation have been utilized in the district for many years to produce a marketable zinc product. Comparatively few of the concentrating plants are equipped with roasters, but practically all the larger mining interests own or control separating plants,[7] and nearly all the raw concentrates were roasted.

The roasting and separating plants operated in Wisconsin in 1926 were those of the National Zinc Separating Co., at Cuba City, and the Mineral Point Zinc Co., at Mineral Point. The shipments made came from about 45 mines, many of which were small and were operated spasmodically.

Sphalerite concentrates shipped in 1926 from mines in the upper Mississippi Valley region (Illinois and Wisconsin) amounted to 113,849 tons, and all of this material except about 1,800 tons was treated at roasting and separating plants in Wisconsin. The average zinc content of the raw sphalerite concentrates from Wisconsin sold in 1926 was 33.8 per cent, and the average value per ton was $21.89, compared with 32.8 per cent and $22.66 in 1925.

The percentage of concentrates recovered from ore is much higher in Wisconsin than in the Joplin region, but the assay of the raw zinc concentrates shows 10 to 45 per cent less zinc content. The new concentrating plants are equipped with more tables than formerly. The concentrates from the tables have a very high iron content, but this can be remedied by roasting; in consequence, more tailings have been rerun during the last three or four years than in all years prior to 1921.

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[6] Bain, H. F., Zinc and Lead Deposits of the Upper Mississippi Valley: U. S. Geol. Survey Bull. 294, 1906, pp. 81–148.

[7] Deutman, E. G., "The roasting and magnetic separation of Wisconsin zinc ores": Eng. and Min. Jour., June 28, 1919, pp. 1107–1111.

Five of the mines owned or controlled by the Mineral Point Zinc Co. (the Booty, Champion, C. A. T., Copeland, and Coker No. 2) were worked in 1926. The Vinegar Hill Zinc Co. worked the Monmouth and Birkett mines at Hazel Green, and the Rodham-McQuitty (abandoned during the year), the Mullen, and the James mines near Shullsburg, and the Middie mine at Benton. The larger mines and mills busy in 1926 were the Booty, Bull Moose, Longhorn, and Champion at New Diggings; the Middie at Benton; the Connecting Link at Cuba City; the Ellis and Lucky Five at Dodgeville; the Coker (No. 2) at Livingston; the Monmouth at Hazel Green; the High Spot at Platteville; the South Rule and Relling at Linden; and the Rodham-McQuitty, James, Mullen, and Copeland at Shullsburg. Other shipments of concentrates were made from the Cherry & Poppa mine and Curwin mines at Benton; St. Rose at Leadmine; Bonfield at Cuba City; and Hazel Green at Hazel Green. The Badger mine was drilled and the Nightingale mill moved to the property. The Paris Hill Mining Co. was developing the McCabe land and expects to build a mill in 1927.

The tailing mills active in 1926 were those of the Lawyer Bros. at the Winskill mine and the Cherry & Poppa on the Longhorn.

Nearly all the zinc carbonate ore was from small mines on Mineral Point Zinc Co. land at Highland. In addition to the zinc carbonate ore shipped, about 4,000 tons of mixed sphalerite and zinc carbonate and silicate ores, which were included with the sphalerite, were sold in 1926. Mines in the Shullsburg and New Diggings districts produced 60 per cent of the galena shipped in 1926. The New Ida Blende Mining Co. drilled 30 holes at Benton, sunk a 120-foot shaft, and was building a 200-ton mill late in 1926. Some drilling was done at the Romey-Swift mine at Leadmine, and a shaft was sunk.

For descriptions of old mines, concentrating plants, and roasting plants in which no essential changes were made during 1926, the reader is referred to Mineral Resources for recent years.

LEAD AND ZINC PIGMENTS AND SALTS

By A. Stoll [1]

SUMMARY

Combined sales of lead and zinc pigments and zinc salts in 1926 decreased 3 per cent in quantity and 7 per cent in value, as compared with 1925. Sales of two of the lead pigments—red lead and sublimed blue lead—were slightly larger than in 1925; sales of only one of the zinc pigments increased—this was lithopone and the gain was 10 per cent.

Generally lower selling prices per ton prevailed in 1926 than in 1925, but the decrease in the prices of several of the products was very small. The lower prices of lead pigments were coincident with lower quotations on pig lead. Prices of high-grade zinc oxide and of lithopone responded to the pressure of keen competition. The average selling prices of leaded zinc oxide and of the zinc salts showed some increase over those of 1925.

PRODUCTION

In this chapter the pigments and salts sold are taken to represent the production, no account being taken of the stocks on hand at the beginning and end of the year. The amounts used by producers at their own plants are included under sales. The total value of lead and zinc pigments and zinc salts sold by domestic producers in 1926 was approximately $106,253,000, as compared with $114,016,000 in 1925 and $105,822,000 in 1924.

Lead pigments sold by domestic manufacturers in the United States, 1917–1926, in short tons

Year	White lead		Basic lead sulphate or sublimed lead		Red lead	Orange mineral	Litharge
	Dry	In oil	White	Blue			
1917	27,869	87,331	8,231	1,369	[a] 25,478	([a])	44,102
1918	20,089	82,799	7,403	1,343	[a] 30,069	([a])	48,874
1919	30,085	109,005	9,068	1,350	[a] 32,362	([a])	46,739
1920	33,678	112,017	12,412	928	[a] 34,431	([a])	62,329
1921	26,738	143,545	11,568	463	21,805	381	41,909
1922	41,598	153,393	13,765	972	30,509	370	58,261
1923	37,786	125,087	11,949	800	38,037	646	75,107
1924	42,622	144,872	14,572	1,088	36,813	331	74,724
1925	43,426	120,479	14,996	1,090	41,669	840	86,546
1926	37,968	111,845	12,271	1,236	42,550	813	82,540

[a] Figures for red lead include orange mineral prior to 1921.

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[1] Figures on imports and exports compiled by J. A. Dorsey, of the Bureau of Mines, from records of the Bureau of Foreign and Domestic Commerce.

Lead pigments sold by domestic manufacturers in the United States, 1925–26

	1925			1926		
	Short tons	Value (at plant, exclusive of container)		Short tons	Value (at plant, exclusive of container)	
		Total	Average		Total	Average
Basic lead sulphate or sublimed lead:						
White	14, 996	$2, 692, 069	$180	12, 271	$2, 221, 115	$181
Blue	1, 090	210, 933	194	1, 236	225, 079	182
Red lead	41, 669	9, 445, 527	227	42, 550	9, 181, 072	216
Orange mineral	840	237, 408	283	813	229, 364	282
Litharge	86, 546	18, 587, 399	215	82, 540	16, 364, 479	198
White lead:						
Dry	43, 426	8, 622, 977	199	37, 968	7, 511, 098	198
In oil	120, 479	31, 352, 776	260	111, 845	28, 662, 988	256

Statistics for lead arsenate and lead acetate are collected biennially by the Bureau of the Census for odd years; figures for 1925 are as follows: Lead arsenate, 5,969 short tons, valued at $1,777,552, and lead acetate, 1,251 short tons, valued at $359,686.

Zinc pigments and salts sold by domestic manufacturers in the United States, 1917–1926, in short tons

Year	Zinc oxide	Leaded zinc oxide	Lithopone	Zinc chloride (50° Baumé)	Zinc sulphate
1917	107, 586	23, 450	63, 713	(1)	(1)
1918	100, 286	26, 714	62, 403	(1)	(1)
1919	117, 639	27, 591	78, 365	[2] 59, 228	[2] 2, 763
1920	99, 444	30, 460	89, 373	[2] 68, 945	[2] 3, 072
1921	74, 329	16, 103	55, 016	59, 457	3, 295
1922	128, 465	19, 613	83, 360	41, 627	5, 078
1923	126, 987	23, 504	98, 199	42, 431	5, 375
1924	131, 470	26, 729	109, 469	51, 054	4, 674
1925	151, 354	31, 750	145, 019	45, 619	5, 332
1926	146, 923	23, 859	159, 931	45, 724	3, 649

[1] No canvass. [2] Figures cover production, not sales.

Zinc pigments and salts sold by domestic manufacturers in the United States, 1925–26

	1925			1926		
	Short tons	Value (at plant, exclusive of container)		Short tons	Value (at plant, exclusive of container)	
		Total	Average		Total	Average
Zinc oxide [1]	151, 354	$21, 441, 347	$142	146, 923	$20, 339, 533	$138
Leaded zinc oxide [1]	31, 750	3, 966, 282	125	23, 859	3, 110, 542	130
Lithopone	145, 019	15, 186, 147	105	159, 931	16, 062, 197	100
Zinc chloride, 50° Baumé	45, 619	2, 003, 828	44	45, 724	2, 150, 682	47
Zinc sulphate	5, 332	269, 763	51	3, 649	195, 167	53

[1] Zinc oxide containing 5 per cent or more of lead is classed as leaded zinc oxide.

SOURCE

The following table gives the quantity and source of the lead and zinc contained in the pigments and salts produced in the United States in 1925 and 1926. It will be noted that the lead content of the lead pigments is derived largely (94 per cent in both years) from pig lead; that the zinc content of the zinc pigments is derived chiefly from domestic zinc ore, slab zinc furnishing the metal in French process zinc oxide; and that the zinc in zinc salts is derived chiefly from secondary materials—zinc ashes, skimmings, drosses, and galvanizers' scrap.

Metal content of lead pigments and zinc pigments and salts produced by domestic manufacturers, 1925–26, by sources, in short tons

Source	1925			1926		
	Lead in pigments[1]	Zinc		Lead in pigments[1]	Zinc	
		Pigments	Salts		Pigments	Salts
Domestic ore	17,547	110,554	673	13,685	127,685	2,106
Metal	256,064	33,581	453	240,902	32,735	51
Secondary material[2]	----------	11,714	10,928	1,029	12,480	10,084
	273,611	155,849	12,054	255,616	172,900	12,241

[1] Includes also lead recovered in zinc oxide and leaded zinc oxide. The metal content of lead acetate and lead arsenate is not available, as no canvass of their production is made by the Bureau of Mines. Moreover, these salts are derived from pig lead, and their metal content has already been taken into statistical account in the figures covering lead production.

[2] Zinc ashes, skimmings, drosses, and old metal.

PREPARATION AND USES

Lead and zinc pigments and salts are made both from the ores and from the metals. Basic lead carbonate, or white lead, and the lead oxides—litharge, red lead, and orange mineral—are made from pig lead, as are also the lead salts; basic lead sulphate, or sublimed lead, is made directly from ore.

White lead is the oldest of the white pigments used in oil paints and was for many years the only white pigment so used. It is produced by chemical corrosion of metallic lead. The oldest and most widely used method of manufacture is the old Dutch process, which is long and painstaking; the Carter process consumes a shorter time in manufacture and is used successfully but not so widely as the old Dutch process. The electrolytic process is used at one plant in the United States. Other processes have been tested and put to commercial use, especially in foreign countries.

Basic lead sulphate, or sublimed lead, is a fine pigment made by volatilizing powdered galena at a high temperature in contact with air which oxidizes it to basic sulphate. The resultant fume is collected in bags. Two forms of this pigment are produced—"white" and "blue"—the former by complete, the latter by partial oxidation.

Litharge, or lead monoxide, is made from pig lead. The metal is melted in a furnace in the presence of air and the skim of litharge which forms is recovered. According to the method employed, the finished product is either in the form of a fine yellowish powder or of reddish-brown flakes.

Red lead is prepared by burning litharge in the muffle furnace to form a higher oxide of a brilliant scarlet or orange red color.

Orange mineral has the same composition as red lead and is produced from white lead by burning.

Lead pigments have many uses. The principal ones are: In the paint and rubber industries; in the manufacture of storage batteries; in making glass, pottery, enamel, tile, linoleum, printing inks, and for artists' colors.

Zinc oxide and lithopone are white zinc pigments that hold important places in a number of industries. The zinc oxide of commerce is divided generally into two classes, according to whether it is made by the American or the French process. As the name implies, American process zinc oxide originated in this country, where its manufacture has been carried on for 75 years. In this process the zinc oxide is made from zinc ore, which is roasted, then treated in reducing furnaces in which metallic zinc is vaporized, and the zinc vapor is oxidized by contact with an excess of air. The white fume so formed is collected in bag houses. American process zinc oxide is of two types—one that is commercially lead free and one that contains from 5 to 35 per cent of lead sulphate. The latter type is commonly known as leaded zinc oxide. French process zinc oxide, first used extensively in France, is also produced in the United States, but not to the extent that the American process zinc oxide is made. It is made by the vaporization of metallic zinc, rather than zinc ore, and the oxidation of the vapors. Zinc oxide made by this process is the highest grade and is used where an extremely bright oxide is required. Zinc oxides are used in many industries, but chiefly in the rubber and paint industries, which, it has been estimated, absorb about 90 per cent of the output of the zinc oxides. They are also used in the manufacture of pottery, glass, oilcloth, printing inks, polishes, and medicinals and cosmetics.

Lithopone is a dense white pigment formed by mixing purified solutions of barium sulphide and zinc sulphate and calcining the resulting precipitate of barium sulphate and zinc sulphide. It passes through a number of processes before it is ready for market, and it is generally graded according to the use to which it is to be put. It is the newest of the pigments here mentioned, but its use has spread rapidly, and its desirable characteristics have brought it into great demand, especially in the manufacture of paints and enamels and to a less degree in the manufacture of rubber goods, oilcloth and linoleum, window shades, and printing inks.

Zinc chloride is formed by the direct combination of zinc with chlorine, or, more generally, by the action of hydrochloric acid upon the metal. Zinc sulphate is prepared either by the action of sulphuric acid on zinc or by the treatment of zinc sulphide ore. The sulphating or Coolbaugh process is used by the American Smelting & Refining Co. at Durango, Colo., for treating lead-zinc sulphide ores. The zinc sulphide is roasted to the sulphate, leached in water, filtered from the residue, and the zinc sulphate crystallized out of the solution by means of a spray drier. Secondary zinc material, such as drosses, ashes, skimmings, and galvanizers' scrap, is utilized largely as the zinc base for the production of zinc chloride and zinc sulphate. Zinc chloride is used extensively in wood preservation. Diluted with water it acts as a powerful disinfectant and germicide. It is also used in the refining of petroleum, in the textile industry, in the manufacture of hard fiber, for medical purposes, and in dentistry. Many of the uses of zinc sulphate are similar to those of zinc chloride. Its greatest application, however, is in the manufacture of lithopone. Some other important uses are: As a mordant in calico printing, as a clarifying agent and preservative in the manufacture of glue, and in medicine as an astringent.

IMPORTS AND EXPORTS

Records of lead pigments imported for consumption in the United States in 1926, as compared with 1925, show increases in the quantity of white lead and red lead, a decided decrease in litharge, and a slight decrease in orange mineral. Of the zinc pigments, imports of lithopone were the largest and made the greatest gain.

Exports of zinc oxide exceeded those of the other lead and zinc pigments for which separate statistics are recorded, and the quantity exported in 1926 was 35 per cent greater than that in 1925. Of the quantity exported in 1926 one-third of the zinc oxide and two-thirds of the white lead were consigned to the United Kingdom.

Basic carbonate white lead, red lead, litharge, and orange mineral imported for consumption in the United States, 1917–1926

Year	Basic carbonate white lead		Red lead		Litharge		Orange mineral	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
1917	20, 238	$1, 965	50	$13	----------	----------	33, 294	$4, 892
1918	508	202	5	1	100	$12	----------	----------
1919	21, 213	2, 490	7, 199	1, 136	----------	----------	39, 781	5, 082
1920	159, 977	19, 449	23, 076	1, 789	21, 002	2, 647	52, 094	5, 352
1921	124, 176	12, 598	12, 236	689	100	7	77, 937	7, 830
1922	222, 465	21, 335	1, 405	94	1, 770	162	111, 419	9, 729
1923	336, 892	31, 386	3, 600	220	22, 525	1, 314	116, 293	9, 031
1924	141, 156	13, 478	1, 874	155	1, 838	193	99, 341	8, 047
1925	213, 028	21, 535	3, 452	268	2, 417	330	58, 522	6, 278
1926	297, 567	31, 690	9, 591	817	122	13	58, 104	5, 143

Zinc oxide, lithopone, zinc sulphide (white), zinc chloride, and zinc sulphate imported for consumption in the United States, 1917–1926

Year	Zinc oxide				Lithopone	
	Dry		In oil		Short tons	Value
	Short tons	Value	Short tons	Value		
1917	119	$52, 649	5	$876	224	$29, 199
1918	162	62, 703	4	1, 043	----------	----------
1919	105	44, 338	3	1, 351	739	122, 708
1920	1, 431	289, 890	14	3, 596	1, 714	263, 240
1921	1, 286	145, 071	57	17, 549	5, 247	432, 019
1922	2, 712	361, 599	42	8, 595	10, 263	885, 671
1923	1, 036	169, 415	89	21, 934	10, 440	776, 383
1924	1, 703	229, 629	110	25, 874	6, 830	543, 025
1925	1, 274	205, 582	132	31, 187	6, 330	478, 395
1926	1, 127	198, 897	94	23, 163	8, 686	661, 700

Zinc oxide, lithopone, zinc sulphide (white), zinc chloride, and zinc sulphate imported for consumption in the United States, 1917–1926—Continued

Year	Zinc sulphide [1]		Zinc chloride		Zinc sulphate	
	Pounds [1]	Value	Short tons	Value	Short tons	Value
1917	9,990	$6,519	2	$403	(2)	$57
1918	2,670	993	98	15,177	--------	--------
1919	10,035	4,413	1	192	(2)	152
1920	45,482	15,027	565	76,495	50	3,038
1921	93,537	8,330	2,199	213,995	17	820
1922	27,159	8,453	1,374	87,509	17	1,064
1923	11,844	5,403	551	44,164	20	3,466
1924	9,678	5,727	319	28,911	13	1,265
1925	14,604	5,589	469	50,712	17	1,368
1926	7,800	4,125	568	51,605	66	4,590

[1] Zinc sulphide is stated in pounds rather than tons because of its high value and smaller quantities.
[2] Less than 1 ton.

White lead and red lead exported from the United States, 1917–1926

Year	White lead [1]		Red lead [2]	
	Short tons	Value	Short tons	Value
1917	9,869	$2,089,659	[3] 1,086	$267,238
1918	7,794	1,756,739	2,870	662,584
1919	14,017	3,037,292	3,114	735,177
1920	14,901	3,195,101	1,532	365,575
1921	5,161	993,130	548	115,500
1922	4,598	710,765	1,683	294,133
1923	[1] 5,172	836,261	[2] 1,840	372,828
1924	[1] 5,055	853,444	[2] 940	210,598
1925	[1] 6,832	1,293,168	802	183,591
1926	[1] 6,239	1,119,350	775	175,273

[1] Exports of white lead and basic lead sulphate or sublimed lead not classified separately after 1922; the figures for 1923–1926 may include an unknown quantity of basic lead sulphate or sublimed lead.
[2] Exports of red lead and litharge not classified separately for 1923–24; the figures for those years may include an unknown quantity of litharge. Figures for other years are for red lead only.
[3] Figures cover July 1 to Dec. 31; not classified separately prior to July.

White lead [1] exported from the United States, 1925–26, by destinations

Destination	1925		1926	
	Short tons	Value	Short tons	Value
North America:				
Canada	99	$18,595	77	$15,562
Cuba	80	17,746	77	20,081
Mexico	128	33,331	120	31,503
Panama	353	84,380	179	40,003
Other	110	26,941	113	28,052
	770	180,993	566	135,201
South America:				
Brazil	1	341	1	198
Colombia	23	5,276	64	10,103
Uruguay	55	10,337	43	8,281
Venezuela	13	3,562	34	7,580
Other	943	197,725	501	95,625
	1,035	217,241	643	121,787

[1] White lead and basic lead sulphate or sublimed lead not classified separately after 1922; the figures may include an unknown quantity of basic lead sulphate or sublimed lead.

White lead exported from the United States, 1925–26, by destinations—Continued

Destination	1925		1926	
	Short tons	Value	Short tons	Value
Europe:				
Belgium	113	$19,096		
Netherlands	484	82,103	627	$92,461
United Kingdom	4,174	733,794	4,156	713,368
Other	1	67	7	1,053
	4,772	835,060	4,790	806,882
Asia:				
Philippine Islands	225	52,266	223	51,298
Other	20	4,673	15	3,376
	245	56,939	238	54,674
Africa	(2)	103	(2)	94
Oceania, including Australia	10	2,832	2	712
	6,832	1,293,168	6,239	1,119,350

[2] Less than 1 ton.

Zinc oxide and lithopone exported from the United States, 1917–1926

Year	Zinc oxide		Lithopone	
	Short tons	Value	Short tons	Value
1917	15,446	$3,148,898	(1)	(1)
1918	12,421	2,779,507	(1)	(1)
1919	14,703	3,059,276	(1)	(1)
1920	11,164	2,151,544	(1)	(1)
1921	2,511	426,253	(1)	(1)
1922	3,977	593,128	1,616	$169,982
1923	5,024	743,577	1,485	176,624
1924	3,927	605,630	923	104,783
1925	10,855	1,503,561	1,287	132,771
1926	14,661	1,917,420	1,941	200,412

[1] Not classified separately prior to 1922.

Zinc oxide exported from the United States, 1925–26, by destinations

Destination	1925		1926	
	Short tons	Value	Short tons	Value
North America:				
Canada	4,320	$630,149	4,229	$614,003
Cuba	36	7,978	51	8,976
Mexico	59	13,127	79	16,676
Panama	136	31,156	114	23,041
Other	38	8,899	54	10,294
	4,589	691,309	4,527	672,990
South America:				
Brazil	11	2,007	11	1,988
Other	186	29,585	114	23,764
	197	31,592	125	25,752
Europe:				
France	92	12,655	733	83,878
Italy	160	20,736	176	20,247
United Kingdom	4,872	615,371	5,318	670,099
Other	765	94,328	3,136	359,018
	5,889	743,090	9,363	1,133,242
Asia:				
Philippine Islands	86	13,436	121	17,091
Other	63	17,506	506	64,768
	149	30,942	627	81,859
Africa			2	370
Oceania, including Australia	31	6,628	17	3,207
	10,855	1,503,561	14,661	1,917,420

PRICES AND VALUE

The total value and the average price per ton received from sales of lead and zinc pigments and salts are given on preceding pages of this chapter. Market quotations on these products are printed weekly in the Oil, Paint and Drug Reporter. The range in 1924 to 1926 was as follows:

Range of quotations on lead pigments and zinc pigments and salts at New York, 1924–1926, in cents a pound

Product	1924	1925	1926
Basic lead sulphate, or sublimed lead	8¾–10½	9½–11½	9 –10½
White lead, or basic lead carbonate	8¾–10½	10¼–12	9¾–10¾
Litharge	10.4–12¼	11¼–13¼	10½–11¾
Red lead	10.9–12¾	11½–13¾	11–12¼
Orange mineral	13.9–15¾	13½–16¾	13¼–14¾
Zinc oxide	8⅜	7¾– 8⅜	7 – 7¾
Lithopone	6⅝– 7⅝	6⅛– 6⅝	5⅞– 6⅝
Zinc chloride	2½– 3¼	2½– 4¼	3 – 4¼
Zinc sulphate	3 – 3¾	3½– 4	3 – 4

Weekly quotations on basic lead sulphate (white), or sublimed lead, "in casks," remained at 10 to 10½ cents a pound from almost the beginning of the year until the week ended November 20, when it dropped to 9¾ cents; the following week it dropped to 9½ cents, and closed the year at 9 to 9½ cents.

The quotation on basic lead carbonate, or white lead, "American, dry, in casks," held steady at 10¾ cents a pound until November 20, when it fell to 10¼ cents. The last two weeks of the year a further reduction brought it to 9¾ cents.

Quotations on litharge, "commercial, powdered, in casks," fluctuated considerably during the year, ranging from 10½ to 11¾ cents a pound, as shown in the preceding table. At the beginning of the year the price quoted was 11¾ cents and at the close 10¾ cents.

Red lead, "dry, in casks," was quoted at 12¼ cents a pound at the opening of the year and at 11¼ cents at the close. The lowest quotation—11 cents—was in the spring.

Quotations on orange mineral, "American, in casks," opened the year at 14¼ cents a pound and fluctuated during the year, but the entire range was only 1½ cents. The quotation at the end of the year was 13½ to 14½ cents.

A review of quotations on all the lead pigments shows a general downward movement of about 1 cent a pound at the end of 1926, as compared with the first of the year.

Zinc oxide, "commercially lead-free, in barrels, l. c. l.," was quoted at 7¾ cents a pound until the latter part of October, when the price was cut to 7⅛ cents. Several changes in quotations followed, and by the end of the year the quotation was 7 to 7⅛ cents.

Lithopone, "domestic, in barrels, l. c. l.," was quoted at 6⅛ to 6⅝ cents a pound from January to May; at 6⅛ cents from June to November; and at 5⅞ cents in December.

Quotations on zinc pigments remained comparatively stable until the fall months, when a reduction of about ½ cent a pound was made.

Quotations on zinc chloride and zinc sulphate kept an even tone throughout the year. Zinc chloride, "solution, works, drums," was quoted at 3 to 4 cents a pound from March to December. Quotations on zinc sulphate, "barrels," ranged from 3 to 4 cents during the year, as compared with a slightly smaller range in 1925.

PRODUCERS AND PLANTS

The following companies reported sales of lead and zinc pigments and zinc salts of their own production in 1926:

White lead:	
Anaconda Lead Products Co. (electrolytic process)	East Chicago, Ind.
Carter White Lead Co	West Pullman, Chicago, Ill.
E. I. du Pont de Nemours & Co	Philadelphia, Pa.
Eagle-Picher Lead Co	East St. Louis, Ill.
Do	Cincinnati, Ohio.
Euston Lead Co	Scranton, Pa.
W. P. Fuller & Co	South San Francisco, Calif.
John T. Lewis & Bros. Co	Philadelphia, Pa.
Matheson Lead Co	Long Island City, N. Y.
National Lead Co. of California	Melrose, Calif.
National Lead Co	Chicago, Ill.
Do	St. Louis, Mo.
Do	Brooklyn, N. Y.
Do	Port Richmond, N. Y.
Do	Cincinnati, Ohio.
National Lead & Oil Co. of Pennsylvania	New Kensington, Pa.
Sherwin-Williams Co	Chicago, Ill.
United Lead Co	Perth Amboy, N. J.
Wetherill & Bro	Philadelphia, Pa.
Basic lead sulphate, or sublimed lead:	
Eagle-Picher Lead Co	Joplin, Mo.
St. Louis Smelting & Refining Works of National Lead Co	Collinsville, Ill.
d lead, orange mineral, and litharge:	
Eagle-Picher Lead Co	East St. Louis, Ill.
Do	Joplin, Mo.
Do	Newark, N. J.
Do	Cincinnati, Ohio.
Evans Lead Co	Charleston, W. Va.
Franklin Lead Oxide Co	Franklin, Pa.
W. P. Fuller & Co	South San Francisco, Calif.
Gould Storage Battery Co	Depew, N. Y.
Grasselli Chemical Co	Grasselli, Ind.
Harshaw Fuller & Goodwin Co	Cleveland, Ohio.
John T. Lewis & Bros. Co	Philadelphia, Pa.
Matheson Lead Co	Long Island City, N. Y.
Metals Refining Co	Hammond, Ind.
National Lead Co. of California	Melrose, Calif.
National Lead Co	Chicago, Ill.
Do	St. Louis, Mo.
Do	Brooklyn, N. Y
National Lead & Oil Co. of Pennsylvania	New Kensington, Pa.
Pennsylvania Smelting Co	Carnegie, Pa.
Sherwin-Williams Co	Chicago, Ill.
Wetherill & Bro	Philadelphia, Pa.
Zinc oxide and leaded zinc oxide:	
American Zinc Co. of Illinois	Hillsboro, Ill.
American Zinc Oxide Co	Columbus, Ohio.
Eagle-Picher Lead Co	Hillsboro, Ill.
Empire Zinc Co	Canon City, Colo.
Grasselli Chemical Co	Grasselli, Ind.
International Lead Refining Co. (French process)	East Chicago, Ind.
Do. (French process)	Akron, Ohio.

Zinc oxide and leaded zinc oxide—Continued.	
Mineral Point Zinc Co	Mineral Point, Wis.
New Jersey Zinc Co. (of Pennsylvania)	Palmerton, Pa.
Do. (French process)	Freemansburg, Pa.
Ozark Smelting & Mining Co	Coffeyville, Kans.
River Smelting & Refining Co	Florence, Colo.
U. S. Zinc Co	Pueblo, Colo.
Western Zinc Oxide Co	Leadville, Colo.
Lithopone:	
Chemical & Pigment Co. (Inc.)	Oakland, Calif.
Do	Collinsville, Ill.
Do	St. Helena, Md.
E. I. du Pont de Nemours & Co	Newark, N. J.
Do	Philadelphia, Pa.
Eagle-Picher Lead Co	Argo, Ill.
Grasselli Chemical Co	Grasselli, N. J.
Krebs Pigment & Chemical Co	Newport, Del.
Mineral Point Zinc Co	Depue, Ill.
New Jersey Zinc Co. (of Pennsylvania)	Palmerton, Pa. (2 plants)
Sherwin-Williams Co	Chicago, Ill.
United Color & Pigment Co	Newark, N. J.
Zinc salts:	
American Zinc & Chemical Co	Langeloth, Pa.
Arkansas Preservative Co	North Little Rock, Ark.
Charles Cooper & Co	Newark, N. J.
General Chemical Co	Chicago, Ill.
Grasselli Chemical Co	Grasselli, Ind.
Do	Grasselli, N. J.
Do	Cleveland, Ohio.
Do	Weirton, W. Va.
Great Western Electro-Chemical Co	Pittsburg, Calif.
Charles Lennig & Co. (Inc.)	Philadelphia, Pa.
Merrimac Chemical Co	Everett, Mass.
Monsanto Chemical Works	Monsanto, Ill.
New Jersey Zinc Co. (of Pennsylvania)	Palmerton, Pa.
Vulcan Detinning Co	Neville Island, Pa.

Lithopone was produced by the Chemical & Pigment Co. (Inc.) at Oakland, Calif., and at Collinsville, Ill., as well as at their St. Helena (Md.) plant which has been in operation since 1920. All of these plants are subsidiaries of The Glidden Co. The Collinsville plant was purchased from the St. Louis Lithopone Co. in June, 1926.

The zinc oxide plant of the U. S. Zinc Co., at Pueblo, Colo., was closed down early in the year and has been dismantled and sold.

York Metal & Alloys Co., York, Pa., reported that they had discontinued the manufacture of zinc products.

Charles Lennig & Co. (Inc.), Philadelphia, Pa., installed equipment that would enable them to produce 125 tons of zinc chloride a month.

ZINC[1]

By Amy Stoll[2]

INTRODUCTION

By J. A. Stader

The great industrial activity and prosperity of the year 1926 in the United States, which surpassed that of 1925, was shared by the industries engaged in the production and consumption of zinc. As in recent years, the largest part of the output of zinc in the United States came from the tri-State district of Missouri, Kansas, and Oklahoma, which has more than 150 concentrating mills. The majority of these mills were in operation throughout the year and were thus the chief factors in the increased production of 1926. The second largest source of zinc is from a number of smaller districts, which during recent years have become very important, in the Northwestern States.

Concentration of lead and zinc ores was first accomplished by crushing and hand picking, but later gravity concentration by means of jigs and tables was employed and was generally used until a few years ago. This method depended solely on the difference in specific gravity of the materials treated and was not entirely satisfactory, as the zinc and lead minerals often were closely associated with others of similar specific gravity from which they could not be cleanly separated. As the method of smelting lead ores differed widely from that of smelting zinc, one or the other metal was partly or wholly lost. In consequence, most of the complex ores were milled for the recovery of lead only, the zinc usually being discarded with the tailings. This wasteful practice prevented the economic treatment of many of the western complex ores; and in the tri-State district much of the finely disseminated zinc blende was lost in the tailings. In large part, however, these tailings have been successsfully re-treated by methods developed since they accumulated.

Three notable developments have greatly advanced methods of treatment. These are improvement in tables, magnetic separation, and selective flotation. Magnetic separation is successful in the treatment of coarsely crystalline mixtures of pyrite and blende but of little use in the treatment of galena-blende ores. Selective flotation revolutionized the art of ore dressing and almost relieved it of dependence on the differences in specific gravity of the materials treated. This process employs principles in a field of physics which is only partly explored by science and is not yet clearly understood.

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[1] Chapters on zinc that were more than ordinarily detailed were issued in Mineral Resources for 1908, dealing largely with metallurgy; for 1915, dealing with the zinc deposits of the United States and foreign countries; and for 1918, dealing with the zinc industry in relation to the World War.

[2] Figures on imports and exports compiled by J. A. Dorsey, of the Bureau of Mines, from records of the Bureau of Foreign and Domestic Commerce.

Use of selective flotation has enormously increased the potential supply of zinc ore by making profitable the exploitation of complex ores of the West which formerly could not be utilized, also by increasing the recovery from tri-State ores. At first its use was handicapped by inadequate apparatus for fine grinding and for filtration. These handicaps have been overcome, and selective flotation is being adopted by nearly all the modern mills of Canada, Mexico, and the United States. The large companies in the Western States are equipped with new or enlarged plants; in the tri-State district flotation has been installed in the great majority of mills and is estimated to have added 15 to 18 per cent to the output of the district.

The increase in output of concentrates has made available a large surplus for export, surpassing the banner year of 1925.

Many metallurgical improvements were noted during the year 1926. The retort smelters increased the charge per retort and overcame many of the minor difficulties encountered in smelting flotation concentrates. No basic change, however, has taken place in the retort method for many years.

The Coley process, developed in England, is reported as having many advantages over the retort process, such as continuous operation and lower cost of labor, fuel, and equipment. The Gordon process and the Waring process are also being developed, but whether any of these processes will supersede roasting and retorting is yet to be seen.

The electrolytic reduction of zinc ores is comparatively an infant process, but in the past few years has grown rapidly. Minor improvements are continually being made which, no doubt, in the near future will be of major importance. The increase in production by this process in 1926 over 1925 was several times greater than the increase in production by the retort process. Electrolytic reduction has extremely important advantages, especially in that it produces zinc of high purity and in that metals are recovered which are lost by the retort process. To the extent that industries consuming zinc are now directed more from testing laboratories than by shop foremen, there is a growing demand for the purer metals which can be better controlled in use. The success attained in the electrometallurgy of zinc is reflected by the enlargements of plants at Trail, British Columbia, and at Great Falls and Anaconda, Mont., and the contemplated construction of other electrolytic zinc-reduction plants at Kellogg, Idaho, and in Ontario on tidewater accessible to power from the Saguenay hydroelectric development, as well as in Upper Silesia, Poland, and possibly Italy. Up to the present time the electroreduction of zinc ore has depended on availability of cheap power. No doubt this method before long will have attained an efficiency which will enable it to compete with the older processes under any circumstances.

The year has been extremely interesting both at home and abroad. The acquisition of controlling stock in the von Giesche mines in Upper Silesia by the Anaconda interests marks an epoch in expansion for the American zinc industry. In Canada many successful prospecting enterprises outlined ore deposits that have added materially to the known zinc resources of the world. Development in Mexico has been mainly toward increased production, very largely through the employment of selective flotation. The concentrates found a favorable market with the European (continental) smelters. A feature of the zinc industry in the United States was the consolidation of smaller operating companies. Should this tendency continue, many of the problems which have always vexed a divided industry will be solved for the benefit of the industry as a whole.

In 1926 the consumption of zinc by the various manufacturing industries was extremely satisfactory and stimulated the producers to respond with so large an increase in production that a large tonnage became available to be absorbed by the foreign markets. The coal strike in England, which almost completely stopped consumption there, more or less disturbed the world's zinc industry. Smelting activities were shifted to the Continent, where the accumulation of large stocks of metal seriously depressed price. Recovery from this depression took many months.

SUMMARY

Zinc produced and consumed in the United States, 1925 and 1926, in short tons

	1925	1926
Production of primary zinc:[1]		
From domestic ore	555,631	611,991
From foreign ore	17,315	6,431
	572,946	618,422
Production of secondary zinc:[1]		
Redistilled	39,181	40,799
Remelted	22,249	23,771
	61,430	64,570
	634,376	682,992
Apparent consumption of primary zinc	500,097	557,026

[1] "Primary zinc," which is produced directly from ore, is here distinguished from "secondary zinc," which is obtained by refining zinc ashes, skimmings, drosses, and old metals. The statistics of secondary zinc are given on p. 234. Wherever in this report the word "zinc" is used without qualification it means primary zinc.

The output of primary zinc in the United States from domestic ores in 1926 was 611,991 short tons, valued at $91,799,000, at the average selling price of zinc—a gain, as compared with 1925, of 10 per cent in quantity and 9 per cent in value.

Distilled and electrolytic zinc produced in the United States, 1917–1926

Year	Domestic primary		Foreign primary		Redistilled secondary		Total	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
1917	584,597	$119,258,000	84,976	$17,335,000	16,835	$3,434,000	686,408	$140,027,000
1918	492,405	89,618,000	25,522	4,645,000	9,918	1,805,000	527,845	96,068,000
1919	452,272	66,032,000	13,471	1,967,000	19,748	2,883,000	485,491	70,882,000
1920	450,045	72,907,000	13,332	2,160,000	21,371	3,462,000	484,748	78,529,000
1921	198,232	19,823,000	2,268	227,000	17,573	1,757,000	218,073	21,807,000
1922	353,274	40,273,000	1,003	114,000	32,988	3,761,000	387,265	44,148,000
1923	508,335	69,134,000	2,099	285,000	39,434	5,363,000	549,868	74,782,000
1924	515,831	67,058,000	1,508	196,000	35,486	4,613,000	552,825	71,867,000
1925	555,631	84,456,000	17,315	2,632,000	39,181	5,955,000	612,127	93,043,000
1926	611,991	91,799,000	6,431	964,000	40,799	6,120,000	659,221	98,883,000

PRODUCTION

PRIMARY ZINC

Primary zinc produced in the United States, 1917–1926, in short tons

APPORTIONED ACCORDING TO SOURCE OF ORE

Year	Domestic[1]	Foreign						Total
		Australia	Canada	Europe	Mexico	South America	Total	
1917	584, 597	26, 140	6, 787	11, 689	40, 360	----------	84, 976	669, 573
1918	492, 405	1, 780	8, 700	113	14, 043	886	25, 522	517, 927
1919	452, 272	630	4, 007	----------	8, 083	751	13, 471	465, 743
1920	450, 045	2, 235	1, 583	----------	8, 978	536	13, 332	463, 377
1921	198, 232	133	521	----------	1, 614	----------	2, 268	200, 500
1922	353, 274	----------	55	----------	948	----------	1, 003	354, 277
1923	508, 335	----------	----------	----------	2, 099	----------	2, 099	510, 434
1924	515, 831	----------	1, 396	----------	112	----------	1, 508	517, 339
1925	555, 631	----------	7, 997	----------	9, 318	----------	17, 315	572, 946
1926	611, 991	----------	----------	----------	6, 431	----------	6, 431	618, 422

APPORTIONED ACCORDING TO LOCALITY AT WHICH REDUCED

Year	Arkansas	Illinois	Kansas	Oklahoma	Pennsylvania	Other States	Total
1917	25, 660	172, 489	76, 048	204, 394	86, 995	103, 987	669, 573
1918	26, 753	141, 844	29, 149	139, 066	77, 342	103, 773	517, 927
1919	31, 437	118, 458	43, 942	121, 988	67, 521	82, 397	465, 743
1920	31, 481	109, 056	41, 044	110, 500	74, 234	97, 062	463, 377
1921	15, 278	48, 865	16, 573	41, 244	36, 378	42, 162	200, 500
1922	13, 627	76, 266	24, 167	74, 537	57, 319	108, 361	354, 277
1923	29, 870	93, 239	32, 006	119, 744	82, 003	153, 572	510, 434
1924	28, 447	93, 370	28, 640	118, 487	83, 016	165, 379	517, 339
1925	27, 145	109, 672	25, 765	138, 906	99, 899	171, 559	572, 946
1926	32, 712	110, 381	33, 671	136, 560	100, 538	204, 560	618, 422

[1] The slab zinc which was rolled is included here.

DISTILLED AND ELECTROLYTIC ZINC

Secondary zinc materials, such as zinc ashes and scrap, carefully selected and redistilled, yield slab zinc of all grades, which enters the market for virtually all purposes. Considerable secondary material is mixed with ore and used by some smelters that regularly handle ore. The quantity of metal so derived can be calculated by the smelters and thus eliminated from the output of primary zinc, but it is virtually impossible to segregate the redistilled secondary zinc by grades or in smelter stocks. Hence, the smelter stocks as given contain some secondary zinc, and the statistics of production of zinc by grades as given in the table below likewise include secondary zinc. The quantity of secondary zinc included in the graded zinc is shown in the first part of the table, which gives the source, by methods of reduction, of the graded zinc.

Distilled and electrolytic zinc, primary and secondary, produced in the United States, 1917–1926, in short tons

APPORTIONED ACCORDING TO METHOD OF REDUCTION

Year	Electrolytic	Distilled primary	Redistilled secondary [1]	Total
1917	[2] 25, 209	[2] 644, 364	16, 835	686, 408
1918	[2] 38, 916	[2] 479, 011	9, 918	527, 845
1919	27, 056	438, 687	19, 748	485, 491
1920	51, 626	411, 751	21, 371	484, 748
1921	11, 559	188, 941	17, 573	218, 073
1922	55, 369	298, 908	32, 988	387, 265
1923	71, 088	439, 346	39, 434	549, 868
1924	77, 493	439, 846	35, 486	552, 825
1925	79, 004	493, 942	39, 181	612, 127
1926	111, 596	506, 826	40, 799	659, 221

APPORTIONED ACCORDING TO GRADE

Year	Grade A (high grade)	Grade B (intermediate)	Grade C (select and brass special)	Grade D (prime western)	Total
1917	97, 707	69, 189	148, 749	370, 763	686, 408
1918	129, 344	68, 987	98, 584	230, 930	527, 845
1919	45, 377	39, 173	140, 917	260, 024	485, 491
1920	80, 713	33, 893	59, 811	310, 331	484, 748
1921	24, 084	4, 996	47, 814	141, 179	218, 073
1922	67, 459	36, 402	49, 980	233, 424	387, 265
1923	89, 739	58, 513	90, 459	311, 157	549, 868
1924	108, 238	48, 874	100, 290	295, 423	552, 825
1925	111, 964	49, 198	81, 176	369, 789	612, 127
1926	143, 224	48, 169	84, 689	383, 139	659, 221

[1] For total production of secondary zinc, see p. 234.

[2] Figures for distilled primary include prime western zinc refined by electrolysis, as follows: 1917, 1,701 tons; 1918, 753 tons; quantities excluded from electrolytic.

ROLLED ZINC

The following table shows the quantity and value of rolled zinc produced in the United States from 1917 to 1926. The greatest annual production during this period was in 1926, when the total output of sheet and strip zinc and boiler plate exceeded 86,000 short tons and was 21 per cent larger than in 1925.

The use of rolled zinc in radio batteries and for automobile accessories is an important factor in the growth of the rolled-zinc industry.

Zinc rolled in the United States, 1917–1926

Year	Pounds	Value	
		Total	Average
1917	118, 883, 421	$20, 776, 290	$0. 175
1918	139, 773, 825	20, 905, 454	. 150
1919	108, 593, 747	11, 447, 569	. 105
1920	106, 467, 530	12, 290, 233	. 115
1921	60, 800, 186	5, 940, 208	. 098
1922	107, 018, 690	8, 546, 109	. 080
1923	111, 666, 474	10, 164, 981	. 091
1924	122, 064, 719	11, 552, 354	. 095
1925	142, 263, 945	14, 514, 234	. 102
1926	172, 668, 298	17, 880, 901	. 104

The following table includes the imports and exports of rolled zinc taken from records of the Bureau of Foreign and Domestic Commerce. The approximate quantity of rolled zinc available annually for consumption in the United States is obtained by deducting the amount exported from the sum of the amounts produced and imported.

The average selling prices of grades B and C slab zinc—the grades of zinc generally rolled—are given for comparison with the average of the finished rolled zinc. The difference, or "spread," between these two figures was greatest during the war, when an increased demand for sheet zinc raised its price. In 1925 and 1926 the difference amounted to 2.5 and 2.8 cents, respectively.

Quotations on sheet zinc, f. o. b. mill, ranged from 11¼ to 12 cents per pound during the year. The price quoted at the end of the year was 11½ cents. These quotations, however, are subject to discounts which may fluctuate while the base quotations remain steady.

Rolled zinc available for consumption in the United States, 1925 and 1926

	1925			1926		
	Pounds	Value		Pounds	Value	
		Total	Average		Total	Average
Sheet zinc not over 0.1 inch thick	60,169,425	$6,195,763	$0.103	59,866,845	$6,478,927	$0.108
Boiler plate and sheets over 0.1 inch thick	2,202,347	199,435	.091	2,469,614	239,215	.097
Strip and ribbon zinc	79,892,173	8,119,036	.102	110,331,839	11,162,759	.101
Total zinc rolled	142,263,945	14,514,234	.102	172,668,298	17,880,901	.104
Sheet zinc imported for consumption	349	55	.158	352	46	.131
Rolled zinc exported	8,392,707	926,841	.110	9,281,465	1,086,967	.117
Available for consumption	133,871,587			163,387,185		
Slab zinc, grades B and C			.077			.076
Spread			.025			.028

The following companies reported production of rolled zinc in the United States in 1926:

Producers of rolled zinc in the United States in 1926

Producer	Location of plant
American Zinc Products Co	Greencastle, Ind.
Ball Bros. Co	Muncie, Ind.
Edes Manufacturing Co	Plymouth, Mass.
Hazel-Atlas Glass Co	Wheeling, W. Va.
Hegeler Zinc Co	Danville, Ill.
Illinois Zinc Co	Peru, Ill.
Matthiessen & Hegeler Zinc Co	La Salle, Ill.
New Jersey Zinc Co	Palmerton, Pa.
The Platt Bros. & Co	Waterbury, Conn.

ZINC DUST

The commercial production of zinc dust, a by-product of the distillation process of smelting zinc, was begun by domestic smelters in 1910 at the Pueblo, Colo., plant of the United States Zinc Co. In 1911 production began at the Clarksburg and Meadowbrook, W. Va., plants of the Grasselli Chemical Co., and in 1917, 13 plants reported an output of 6,123 short tons. The table following gives the annual production from 1917 to 1926:

Zinc dust sold by producers in the United States, 1917–1926

Year	Prepared "blue powder"			Zinc dust "atomized"			Primary zinc recovered as zinc dust (short tons)[1]
	Short tons	Value		Short tons	Value		
		Total	Average per pound		Total	Average per pound	
1917	3,989	$1,322,196	$0.166	2,134	$712,922	$0.167	3,590
1918	4,016	877,171	.109	3,139	815,346	.130	4,166
1919	4,083	801,366	.098	2,715	566,294	.104	3,430
1920	9,066	2,009,117	.111	2,463	555,773	.113	6,425
1921	2,006	333,390	.083	999	152,151	.076	1,380
1922	3,394	531,225	.078	3,859	573,220	.074	2,113
1923	3,676	643,766	.088	4,376	702,923	.080	2,450
1924	3,894	620,078	.080	4,063	621,221	.076	1,861
1925	[2] 8,314	[2] 1,500,758	[2] .090	(2)	(2)	(2)	2,251
1926	7,994	1,490,293	.093				2,794

[1] The amount of secondary zinc recovered in zinc dust, 1923–1926, is shown in the table on secondary zinc, p. 234.

[2] Figures for "atomized" included under "blue powder." Bureau of Mines not at liberty to publish figures separately.

The following companies reported the production of zinc dust in 1926:

Producers of zinc dust in the United States in 1926

Producer	Location of plant
The Alloys Co	San Francisco, Calif.
John Finn Metals Works	Do.
Grasselli Chemical Co	Clarksburg, W. Va.
New Jersey Zinc Co	Palmerton, Pa.
United States Zinc Co	Sand Springs, Okla.

Under the heading of "Industrial chemicals," the Oil, Paint and Drug Reporter quoted prices on zinc dust, in barrels, ranging from 9 to 11 cents per pound during the year. The average quotation for the year was 10 cents.

ZINC PIGMENTS AND SALTS

Zinc forms the base, either in whole or in part, of three white pigments—zinc oxide, leaded zinc oxide, and lithopone. Two zinc salts, the chloride and the sulphate, are likewise made in part from ore and in part from secondary zinc. Details of the production of zinc pigments and salts and of market conditions are given in the chapter on lead and zinc pigments and salts.

The zinc content of the pigments and salts made in the United States from ore, both domestic and foreign, for the period 1917 to 1926 appears in the table that follows. Statistics of the secondary zinc recovered in the form of pigments and salts are given under the next heading.

Primary zinc content of zinc pigments and salts made in the United States, 1917–1926, in short tons

Year	Pigments	Salts	Year	Pigments	Salts
1917	97,573	(1)	1922	93,112	1,801
1918	102,778	(1)	1923	115,970	1,573
1919	96,817	3,393	1924	108,282	1,075
1920	110,695	6,284	1925	110,554	673
1921	53,480	3,749	1926	127,685	2,106

(1) Figures not available.

SECONDARY ZINC

The accompanying table shows the amount of secondary zinc recovered in the United States as metal and in zinc dust, zinc pigments, and zinc salts, 1923 to 1926. Further details regarding the recovery of secondary zinc are given elsewhere in Mineral Resources in the chapter on secondary metals.

Secondary zinc recovered in the United States, 1923–1926, in short tons

	1923	1924	1925	1926
Secondary zinc, redistilled	39, 434	35, 486	39, 181	40, 799
Secondary zinc, remelted	25, 776	23, 400	22, 249	23, 771
Recovered zinc in alloys, excluding old brass remelted	8, 630	10, 500	13, 300	13, 430
Recovered zinc in remelted brass (estimated)	65, 000	63, 000	53, 300	63, 000
Secondary zinc recovered as metal	139, 000	132, 000	128, 000	141, 000
Secondary zinc recovered in zinc dust	3, 962	5, 093	5, 232	4, 400
Secondary zinc recovered in pigments	10, 322	9, 021	11, 714	12, 480
Secondary zinc recovered in zinc salts	10, 719	10, 225	10, 928	10, 084
Total secondary zinc	164, 000	157, 000	156, 000	168, 000

BY-PRODUCT SULPHURIC ACID

An important by-product of zinc-smelting operations is the sulphuric acid made from the sulphur gases evolved in roasting the zinc sulphide ores preparatory to their distillation or conversion to zinc oxide or to zinc salts. Sulphur gases from zinc ores were first thus utilized by Matthiessen & Hegeler, at La Salle, Ill., in 1882, but now these gases are used at numerous acid plants. These plants may be at zinc smelters and zinc oxide plants, at roasting and magnetic separating plants, at the mines, or nearer the acid markets, the roasted concentrates being shipped to the smelters or to other zinc plants.

The following table gives the quantity and value of sulphuric acid of different strengths produced and sold by plants associated with zinc-blende roasting operations. Figures for 1923 were collected by the Bureau of the Census; those for 1924 to 1926 were collected by the Bureau of Mines.

There was a slight increase in the total quantity sold in 1926 as compared with 1925, and the average selling value per ton of the total sales (60° B.) was 56 cents greater.

By-product sulphuric acid produced at zinc-blende roasting plants in the United States, 1923–1926

	1923	1924	1925	1926
Number of establishments	11	22	22	22
Acid reported as 50°–60° B.:				
Produced short tons	290, 370	[1] 507, 208	[1] 616, 171	[1] 647, 380
Consumed at works do		[1] 32, 721	[1] 31, 902	[1] 37, 555
Sold do	290, 370	[1] 464, 483	[1] 599, 729	[1] 615, 356
Value of acid sold:				
Total	$2, 453, 964	$4, 203, 619	$5, 175, 994	$5, 839, 666
Average	$8. 45	$9. 05	$8. 63	$9. 49
Acid reported as 66° B. and stronger:				
Produced short tons	76, 809	[2] 354, 417	[2] 388, 699	[2] 401, 841
Consumed at works do		[2] 40, 484	[2] 46, 781	[2] 50, 412
Sold do	76, 809	[2] 308, 951	[2] 369, 974	[2] 364, 706
Value of acid sold:				
Total	$921, 056	$4, 248, 640	$4, 918, 716	$4, 935, 104
Average	$12. 00	$13. 75	$13. 29	$13. 53
Total acid sold, equivalent in 60° B.:				
Quantity short tons	384, 489	835, 225	1, 043, 697	1, 053, 003
Value	$3, 375, 020	$8, 452, 259	$10, 094, 710	$10, 774, 770
Total consumed at works (60° B.) short tons	(3)	81, 302	88, 039	98, 049

[1] Expressed as 60° B.

[2] Expressed as 66° B.

[3] Figures not available.

A list of the operators and the location of acid plants whose outputs in the years 1924 to 1926 are shown in the preceding table follows. Plants that are at zinc smelters are also indicated in the list of zinc-reduction plants on page 237. The American Zinc Oxide Co., of Columbus, Ohio, has a zinc-roasting plant and disposes of the sulphur gases to the neighboring plant of the Farmers' Fertilizer Co.

Early in 1927 the National Zinc Co., subsidiary of the International Minerals & Metals Corporation, started the erection of a new sulphuric acid plant at Bartlesville, Okla., to replace the present plant of the company near Kansas City. The new plant will have a capacity approximately equal to that of the old one—5,000 tons of 60° acid a month—and will use the contact instead of the chamber process of acid making.

Producers of by-product sulphuric acid at zinc-blende roasting plants in the United States, 1924-1926

Producer	Location of plant
American Steel & Wire Co	Donora, Pa.
American Zinc & Chemical Co	Langeloth, Pa.
American Zinc Co. of Illinois	East St. Louis, Ill.
Do	Hillsboro, Ill.
American Zinc Oxide Co	Columbus, Ohio.
Bertha Mineral Co	Tiltonsville, Ohio.
Eagle-Picher Lead Co	Hillsboro, Ill.
Grasselli Chemical Co	Grasselli, Ind.
Do	Canton, Ohio.
Do	Cleveland, Ohio.
Do	Lockland, Ohio.
Do	Niles, Ohio.
Do	New Castle, Pa.
Hegeler Zinc Co	Danville, Ill.
Illinois Zinc Co	Peru, Ill.
Matthiessen & Hegeler Zinc Co	La Salle, Ill.
Mineral Point Zinc Co	Depue, Ill.
Do	Mineral Point, Wis.
National Zinc Co	Argentine, Kans.
National Zinc Separating Co	Platteville, Wis.
New Jersey Zinc Co. (of Pennsylvania)	Palmerton, Pa.
United Zinc Smelting Corporation	Moundsville, W. Va

In the 22 plants listed the acid was derived wholly from the burning of zinc ores and sulphur. Four plants used blende only, two plants used sulphur only, and the remainder used both blende and sulphur. The quantity of blende and sulphur used and the production of acid from each are given below, as well as the respective values based on the average selling value of 60° B. acid.

The distribution of acid according to source, whether from zinc blende or sulphur, is based on calculation to some extent. Statistics of production by source therefore do not agree exactly with statistics of production by strengths, as given in the foregoing table.

Production and value of sulphuric acid made from blende and sulphur at zinc-blende roasting plants in the United States in 1926

Number of establishments	22
Blende used short tons	610, 559
Acid made, equivalent in 60° B. do	595, 700
Value at $9.49 per ton (average of sales of 60° B.)	$5, 653, 193
Sulphur used short tons	141, 762
Acid made, equivalent in 60° B. do	536, 755
Value at $9.49 per ton (average of sales of 60° B.)	$5, 093, 805
Total quantity of acid made (60° B.) short tons	1, 132, 455
Total value of acid made	**$10,746, 998**

MINE PRODUCTION

The preceding tables, except those for sulphuric acid, give the quantity of zinc recovered either as metal by smelting and by electrolytic reduction, or in zinc dust, or as zinc in pigments and salts. The table that follows shows the origin of the domestic zinc that is recovered by metallurgical operations. The origin of the zinc by States is obtained more accurately from the reports of mines, because smelters necessarily treat mixtures of ores, sometimes long after they have been received, so that the actual output of metallic zinc may not correspond at all closely to the product of the mines for the same year. The data for the tables of mine production are taken from the reports on gold, silver, copper, lead, and zinc in the different States. Deduction has been made for loss in smelting, so that the following figures represent zinc that should be recovered.

In 1926 the mine output of recoverable zinc was 774,563 short tons, the highest on record and an increase of 9 per cent over the production of 1925, which was 11 per cent higher than that of 1924. Increases were recorded in all of the important zinc-producing States except New Jersey and Oklahoma. Notwithstanding the decrease in Oklahoma, the output of the Joplin region (Oklahoma-Kansas-Missouri) increased 6,857 tons. This region contributed 55 per cent of the total mine output of zinc in 1926, compared with 59 per cent in 1925.

Mine production of recoverable zinc in the United States, 1917–1926, in short tons

State	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
Arizona	10,447	1,135	859	729	--------	105	260	--------	3,666	6,473
Arkansas	6,691	951	189	329	15	134	148	4	43	87
California	5,436	2,781	236	583	423	1,506	--------	1,530	5,745	10,217
Colorado	60,158	44,567	18,610	24,395	1,180	11,629	27,076	28,364	30,811	32,500
Idaho	39,927	22,581	7,997	13,966	17	2,055	13,976	7,670	15,619	26,307
Illinois	4,267	3,792	6,788	4,720	2,426	3,124	1,266	2,512	2,724	2,577
Iowa	18	--------	--------	--------	--------	--------	--------	--------	--------	--------
Kansas	20,249	30,197	47,636	61,073	36,994	56,225	100,969	105,392	118,778	126,307
Kentucky	751	315	36	9	220	142	270	492	429	1,838
Missouri	132,918	55,992	31,540	24,509	10,845	16,171	18,265	12,920	14,794	26,018
Montana	93,130	104,629	84,382	92,169	11,638	59,535	70,730	64,238	57,658	73,701
Nevada	11,154	8,362	4,502	5,349	35	1,309	7,083	5,501	7,411	5,409
New Hamsphire	45	14	--------	--------	--------	--------	--------	--------	--------	--------
New Jersey	121,043	102,318	92,516	78,511	56,447	73,657	75,227	84,370	89,261	80,629
New Mexico	15,100	12,025	3,797	5,007	114	2,248	8,248	10,380	9,246	12,052
New York	5,192	3,776	5,120	5,654	1,572	4,816	8,463	4,664	5,158	5,041
Oklahoma	85,835	161,401	178,410	219,727	121,372	209,682	242,421	269,137	283,371	272,567
Tennessee	28,498	21,071	23,247	19,217	9,692	15,568	15,900	14,376	16,256	12,098
Texas	11	--------	--------	--------	--------	--------	--------	--------	--------	--------
Utah	10,643	9,200	2,216	4,079	35	2,560	5,665	9,281	26,306	47,590
Virginia	1,703	951	--------	--------	--------	--------	--------	2,664	2,732	5,830
Washington	598	19	--------	213	225	614	1,512	455	609	522
Wisconsin	59,742	50,014	40,765	27,285	3,390	10,952	13,211	14,027	20,230	26,800
	713,556	636,091	548,846	587,524	256,640	472,032	610,690	637,977	710,847	774,563

ZINC-REDUCTION PLANTS

Zinc-smelting plants operating in the United States in 1926

Operating company (A=acid plant located at the smelter)	Location of plant	Retorts
ARKANSAS		
Athletic Mining & Smelting Co	Fort Smith	3,328
Falcon Zinc Co	Van Buren	3,200
ILLINOIS		
American Zinc Co. of Illinois (A)	East St. Louis	5,620
Hegeler Zinc Co. (A)	Danville	5,400
Illinois Zinc Co. (A)	Peru	4,640
Matthiessen & Hegeler Zinc Co. (A)	La Salle	6,132
Mineral Point Zinc Co. (A)	Depue	9,068
Missouri Zinc Co	Beckemeyer	384
INDIANA		
Grasselli Chemical Co	Terre Haute	4,200
KANSAS		
Edgar Zinc Co	Cherryvale	5,040
Weir Smelting Co	Caney	1,920
OKLAHOMA		
Blackwell Zinc Co. (Inc.)	Blackwell	9,600
Eagle-Picher Lead Co	Henryetta	4,800
National Zinc Co	Bartlesville	4,256
Quinton Spelter Co	Quinton	3,360
Tulsa Fuel & Manufacturing Co	Collinsville	3,392
United States Zinc Co	Henryetta	3,200
Do	Kusa	3,760
PENNSYLVANIA		
American Steel & Wire Co. (A)	Donora	8,512
American Zinc & Chemical Co. (A)	Langeloth	4,864
New Jersey Zinc Co. (of Pennsylvania) (A)	Palmerton	7,200
TEXAS		
United States Zinc Co	Amarillo	4,000
WEST VIRGINIA		
Grasselli Chemical Co	Clarksburg	5,760
Do	Meadowbrook	8,400
United Zinc Smelting Corporation (A)	Moundsville	2,368
		122,404

The number of retorts at zinc smelters at the end of 1926 was 122,404 at 25 plants that had been busy some time during the year. The number of retorts in operation at 24 of these plants at the end of the year was 89,496, compared with 95,460 in operation at the 25 plants at the end of 1925. The smelter of the Tulsa Fuel & Manufacturing Co., at Collinsville, Okla., was idle at the end of 1926.

The United States Zinc Co. reported 800 retorts under construction at its smelter at Amarillo, Tex.

In addition to the foregoing regular retort smelters, the Anaconda Copper Mining Co. operated its electrolytic zinc plant at Great Falls, Mont. The two-unit extension to the plant was completed and put into commission early in the year.

Two new electrolytic plants are to be constructed, one by the Anaconda Copper Mining Co., at Anaconda, Mont., and the other by the Sullivan Mining Co., at Kellogg, Idaho. The Anaconda plant will have a daily capacity of 150 tons and the first unit of the Kellogg plant a daily capacity of 50 tons. Plans for the Kellogg plant call for the early construction of two more similar units.

The following operators treated secondary materials in large graphite retorts in 1926:

General Smelting Co., Philadelphia, Pa.
Superior Zinc Corporation, Philadelphia, Pa.
Tottenville Copper Co., Tottenville, N. Y.
Trenton Smelting & Refining Branch of Federated Metals Corporation, Trenton, N. J.
Wheeling Steel Corporation, Wheeling, W. Va.

The Birmingham Smelting & Refining Co., Birmingham, Ala., also began the redistillation of zinc from dross in large graphite retorts early in 1927.

WORLD'S PRODUCTION

The following tables prepared by L. M. Jones, of the Bureau of Mines, show the world's smelter production and mine production of zinc from 1922 to 1926, so far as statistics are available. Official figures are used wherever possible. For countries for which official data are not yet available the figures are taken from the Yearbook of the American Bureau of Metal Statistics and other reliable sources, but the official statistics will be substituted as received.

There is always a possibility of duplication in figures showing European production, for some countries send crude zinc of poor quality to other countries for refining. Furthermore, secondary zinc is included in the figures showing the foreign production, so that to put the United States on an equal footing in the statistics it would be necessary to include in the statement of its production figures for the domestic output of secondary zinc.

World's smelter production of zinc, 1922–1926, in metric tons, by countries where smelted

Country	1922	1923	1924	1925	1926
Australia: Tasmania	23,894	41,814	47,423	46,431	47,972
Austria	250				
Belgium	112,290	147,040	161,700	170,860	191,070
Canada	25,533	27,238	24,896	34,892	55,998
China	406	508	203	305	300
Czechoslovakia	2,045	2,197	6,897	3,000	3,200
France	39,716	49,334	57,712	64,260	72,455
Germany:					
Upper Silesia	[1] 36,615	(2)	(2)	(2)	(2)
Other Germany	41,535	34,945	40,910	62,494	68,292
Great Britain	18,624	31,782	39,098	38,671	18,278
Indo-China			72	1,158	1,858
Italy	3,082	3,681	5,959	6,478	7,636
Japan	12,526	13,780	14,069	16,950	17,000
Mexico		145	(3)	134	(3)
Netherlands	12,997	16,440	18,190	21,117	24,796
Norway	1,850	3,783	5,024	6,807	5,359
Poland:					
Upper Silesia	[4] 42,275	83,847	76,708	98,145	106,233
Other Poland	9,126	11,831	20,000	16,194	17,508
Rhodesia, Northern				240	240
Russia	118	19	[5] 516	[5] 1,490	3,000
Spain	6,269	10,922	12,777	15,122	16,065
Sweden	1,550	1,214	3,451	4,672	4,800
United States	321,393	463,056	469,320	519,765	561,020
Yugoslavia	1,056	1,947	2,126	2,075	2,376
Known production	713,000	946,000	1,007,000	1,131,000	1,225,000

[1] First 6 months; for second 6 months, see Poland.
[2] See Poland, as zinc smelters were in territory allotted to Poland.
[3] Data not available.
[4] Second 6 months; for first 6 months, see Germany.
[5] Data for operating year ended Sept. 30.

World's mine production of zinc ore and concentrates, with estimated zinc content, 1922–1926, in metric tons

Country	1922		1923		1924		1925		1926	
	Ore	Zinc content	Ore	Zinc content	Ore	Zinc content	Ore	Zinc content	Ore	Zinc content
North America:										
Canada	323,043	46,709	(1)	[2] 27,404	(1)	[2] 44,864	(1)	[2] 49,563	(1)	[2] 68,010
Mexico	(1)	6,342	41,819	18,481	58,599	24,659	120,120	51,795	(1)	105,367
United States (recoverable zinc)	(1)	428,218	(1)	554,006	(1)	578,760	(1)	644,866	(1)	702,668
South America:										
Bolivia (exports)	--------	--------	390	(1)	485	(1)	6,210	2,750	17,560	7,937
Peru	--------	--------	--------	--------	(1)	145	(1)	14,418	(1)	21,629
Europe:										
Austria [3]	30	12	1,168	472	1,227	488	1,892	777	(1)	(1)
Belgium	26	(1)	36	(1)	850	(1)	10,201	(1)	(1)	(1)
Bulgaria	75	(1)	(1)	(1)	(1)	(1)	--------	--------	425	(1)
Czechoslovakia	1,316	(1)	25	(1)	690	(1)	(1)	(1)	(1)	(1)
France	4,656	2,000	10,940	5,000	15,072	7,000	14,765	6,600	18,800	(1)
Germany [4]	[5] 97,990	[5] 40,589	77,691	31,782	102,513	41,667	122,208	49,128	(1)	(1)
Great Britain	1,646	590	2,158	950	2,354	826	1,629	572	1,975	854
Greece—										
Zinc ore	1,149	(1)	4,026	1,038	4,861	1,191	(1)	(1)	(1)	(1)
Zinc-lead ore	132	(1)	314	31	81	9	(1)	(1)	(1)	(1)
Italy—										
Zinc ore	94,956	40,160	132,596	52,455	151,473	58,302	177,085	68,886	177,932	70,675
Zinc-lead ore	668	132	1,711	400	855	168	1,883	426	3,109	700
Norway	552	248	2,226	882	1,389	633	853	327	165	32
Poland—										
Upper Silesia	227,881	(1)	213,814	(1)	236,812	(1)	310,960	(1)	402,642	(1)
Other Poland	66,400	(1)	86,708	(1)	71,387	(1)				
Portugal	1,200	600	22	11	--------	--------	65	33	(1)	(1)
Russia	795	(1)	1,528	(1)	[6] 1,862	(1)	[6] 5,774	(1)	(1)	(1)
Spain	71,996	23,954	102,313	38,050	116,721	41,921	167,939	48,816	201,335	(1)
Spitzbergen	--------	--------	--------	--------	--------	--------	236	153	145	90
Sweden	38,023	14,186	41,912	15,719	47,691	17,139	51,183	18,636	(1)	(1)
Yugoslavia	228	(1)	618	(1)	549	(1)	535	(1)	581	(1)
Asia:										
China (exports)	61,242	(1)	61,064	(1)	20,456	(1)	37,747	(1)	24,791	(1)
Chosen	--------	--------	--------	--------	1,051	(1)	3,579	(1)	7,102	(1)
India (British)	18,351	(1)	2,095	(1)	18,949	(1)	17,080	(1)	(1)	(1)
Indo-China	20,936	9,421	30,500	12,800	42,451	17,829	52,869	20,792	62,051	25,053
Japan	(1)	(1)	24,876	(1)	23,317	(1)	(1)	(1)	(1)	(1)
Africa:										
Algeria	31,439	13,500	[7] 49,331	20,200	42,759	17,831	56,756	22,702	62,154	27,933
Rhodesia, Northern	3	(1)	73	(1)	--------	--------	6,298	(1)	453	(1)
Tunisia	8,868	3,547	12,000	4,800	14,811	5,200	[7] 31,000	8,985	[7] 37,000	10,050
Oceania:										
Australia [8]—										
New South Wales	369,518	174,000	432,887	195,000	359,326	162,000	230,161	108,000	271,827	111,000
Queensland	(1)	(1)	(1)	(1)	(1)	130	(1)	173	[9] 563	203
New Caledonia	--------	--------	--------	--------	--------	--------	2,000	620	2,200	638

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[1] Data not available.
[2] Estimated smelter recoveries.
[3] Data relate only to zinc concentrates; lead-zinc ores and concentrates not included.
[4] Data relate to concentrates and ore sold without concentration.
[5] Exclusive of the Upper Silesian territory allocated to Poland.
[6] Year ended Sept. 30.
[7] Small quantity of zinc-lead ore included.
[8] In addition to the States listed, Tasmania also produced zinc ore in 1924 and subsequent years, but figures of production are not available.
[9] Exports.

IMPORTS AND EXPORTS

The following tables of zinc remaining in warehouse and of imports and exports of zinc have been compiled from the publications and records of the Bureau of Foreign and Domestic Commerce.

Zinc remaining in warehouse in the United States, December 31, 1917–1926

Year	Ore and calamine		Blocks, pigs, and old		Zinc dust	
	Zinc content (pounds)	Value	Pounds	Value	Pounds	Value
1917	53,997,636	$1,177,680	63,545	$3,949	64,812	$5,710
1918	53,766,247	1,089,560				
1919	37,696,007	674,384				
1920	51,299,109	996,386				
1921	28,583,018	647,654	262,221	10,911		
1922			160,976	6,396		
1923	1,736,874	84,977	160,976	6,396	[1] 2,048	[1] 256
1924	12,103,110	494,605			[1] 998	[1] 38
1925	40,938,685	1,936,332				
1926	27,580,974	1,331,318				

[1] Includes manufactures of zinc.

Zinc imported for consumption in the United States, 1917–1926

Year	Blocks or pigs		Sheets		Old		Zinc dust		Value of manufactures	Total value
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value		
1917	18	$2,279	73	$16,570	259	$25,974	233	$48,604	$250	$93,677
1918	11	2,897	(1)	29	24	2,056	16	3,552	331	8,865
1919	32	2,284	1	249	37	2,216	52	5,753	1,258	11,760
1920	(1)	17	4	614	14	1,065	17	6,207	1,746	9,649
1921	6,598	559,870	6,688	496,445	6	341	42	1,121	8,290	1,066,067
1922	40	3,327	416	59,037	46	2,403	79	5,614	9,517	79,898
1923	1	375	(1)	41	20	1,624	4	891	16,331	19,262
1924	11	1,973	(1)	88	14	1,493	59	9,241	20,089	32,884
1925	(1)	303	(1)	55	24	2,495	116	20,936	18,979	42,768
1926	(1)	195	(1)	46	21	1,315	2	451	44,574	46,581

[1] Less than 1 ton.

Zinc ore imported into the United States, 1917–1926, in short tons

[General imports]

Year	Canada		Mexico		Other countries		Total	
	Ore	Zinc content	Ore	Zinc content	Ore	Zinc content	Ore	Zinc content
1917	16,559	5,155	145,358	45,697	49,678	21,622	211,595	72,474
1918	14,987	5,173	53,348	18,426	2,567	1,210	70,902	24,809
1919	10,656	3,878	33,443	11,225	4,550	1,906	48,649	17,009
1920	4,731	1,794	47,453	14,975	13,589	5,718	65,773	22,487
1921	1,471	554	6,050	2,147	18	4	7,539	2,705
1922	(1)	235	(1)	1,665	(1)	29	(1)	1,929
1923	(1)	4	(1)	3,201	(1)	18	(1)	3,223
1924			(1)	4,649			(1)	4,649
1925	(1)	3,894	(1)	9,607	(1)	35	(1)	13,536
1926	(1)	2,281	(1)	12,265	(1)	21	(1)	14,567

[1] Gross weight not recorded.

Old brass fit only for remanufacture imported into the United States 1917–1926

[General imports; average composition about one-third zinc and two-thirds copper]

Year	Short tons	Value	Year	Short tons	Value
1917	27,580	$9,931,721	1922	71,962	$10,985,308
1918	6,115	1,774,002	1923	20,395	3,992,917
1919	7,938	2,157,948	1924	4,636	698,022
1920	22,355	5,174,885	1925	5,374	772,906
1921	20,449	2,373,082	1926	4,311	631,973

High-grade willemite ore was exported from New Jersey to Europe for a number of years prior to the World War. Zinc ores from Western States were also shipped to Canada, although the amount has been small in recent years. A new phase of the zinc industry began in 1924 with the shipment abroad of several hundred tons of zinc concentrates from the Joplin district (Kansas-Missouri-Oklahoma). This industry grew rapidly in 1925, and export shipments during that year from all parts of the country amounted to 68,951 short tons. In 1926 shipments increased 38 per cent and amounted to 95,252 tons, of which 66 per cent was consigned to Belgium, 19 per cent to Germany, and 10 per cent to France.

Domestic zinc ore and domestic manufactures of zinc exported from the United States, 1917–1926

Year	Zinc ore and concentrates		Pigs or slabs		Plates and sheets		Zinc dross		Zinc dust	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
1917	1, 320	$63, 043	137, 282	$32, 605, 767	16, 514	$5, 730, 792	13, 302	$2, 126, 909	(1)	(1)
1918	62	2, 480	66, 369	12, 469, 622	13, 875	4, 566, 756	15, 816	2, 238, 913	(1)	(1)
1919	-------	-------	109, 746	17, 524, 153	19, 762	5, 212, 002	5, 123	739, 295	(1)	(1)
1920	-------	-------	74, 046	12, 495, 144	11, 852	2, 832, 993	2, 445	316, 637	(1)	(1)
1921	-------	-------	1, 753	204, 984	1, 816	425, 618	510	45, 340	(1)	(1)
1922	1, 695	33, 592	26, 815	2, 994, 625	3, 217	574, 491	8, 412	662, 080	1, 998	$287, 890
1923	[2] 2, 804	(2)	42, 131	5, 961, 525	3, 732	764, 369	[3] 14, 745	[3] 1, 221, 986	3, 679	507, 289
1924	[2] 368	(2)	[4] 72, 583	[4] 9, 538, 459	3, 658	784, 728	[3] 10, 845	[3] 974, 179	2, 270	353, 867
1925	68, 951	3, 277, 118	[4] 76, 351	[4] 11, 654, 441	4, 196	926, 841	15, 968	1, 567, 697	2, 242	408, 017
1926	95, 252	4, 056, 067	[4] 42, 920	[4] 6, 360, 671	4, 641	1, 086, 967	10, 461	1, 100, 988	1, 091	224, 841

[1] Figures not available prior to 1922.

[2] Not separately enumerated by Bureau of Foreign and Domestic Commerce in 1922 and 1923 but included with "Zinc dross"; Canadian smelters reported imports of 2,804 tons of zinc ore and concentrates from the United States in 1923; exporters from the Joplin district reported 368 tons of concentrates shipped to Belgian smelters in 1924.

[3] Exports of zinc ore and dross are lumped together, these figures include the quantity and value of zinc ore exported as shown in the first column.

[4] Exports of slab zinc made from foreign ore are not given separately but have been included with domestic exports after 1923.

Foreign zinc exported from the United States, 1917–1926

Year	Exported from warehouse			Exported in manufactures with benefit of drawback, slabs and sheets excluded (short tons)
	Blocks, pigs, and old		All other manufactures (value)	
	Short tons	Value		
1917	64, 680	$12, 429, 356	$50	1, 588
1918	20, 069	3, 565, 127	-------	6, 337
1919	12, 256	1, 943, 507	13, 071	4, 533
1920	28, 132	4, 331, 636	-------	237
1921	1, 256	100, 677	10, 785	130
1922	3, 471	429, 122	30, 227	1, 298
1923	7, 080	941, 257	(1)	-------
1924–1926	(2)	(2)	(2)	-------

[1] Not given separately.

[2] Exports of slab zinc made from foreign ore are not given separately but have been included with domestic exports after 1923.

Domestic brass and brass manufactures exported from the United States, 1917–1926

[Zinc content approximately 30 per cent by weight]

Year	Bars, plates, and sheets		Scrap and old		Articles made from brass (value)	Total value
	Short tons	Value	Short tons	Value		
1917	164,173	$101,521,426	4,149	$1,758,384	$136,611,299	$239,891,109
1918	15,495	9,522,934	2,455	799,318	19,483,146	29,805,398
1919	3,885	2,310,561	661	176,028	11,426,289	13,912,878
1920	2,905	1,671,608	1,030	254,189	13,202,854	15,128,651
1921	1,437	741,110	2,969	405,871	7,123,366	8,270,347
1922	1,830	635,449	3,147	514,322	7,675,979	8,825,750
1923	1,733	703,503	6,587	1,198,560	6,917,901	8,819,964
1924	2,265	740,993	29,294	5,352,197	6,299,046	12,392,236
1925	3,988	1,359,594	48,189	9,889,153	7,315,707	18,564,454
1926	2,377	884,907	25,132	4,944,277	7,844,746	13,673,930

Domestic and foreign zinc exported from the United States, 1925–26, by destinations

Destination	Slabs, blocks, or pigs		Sheets, strips, etc.	
	Short tons	Value	Short tons	Value
1925				
North America:				
Canada	695	$110,796	1,535	$317,088
Cuba	1	208	223	48,742
Mexico	491	75,741	270	52,520
Panama	20	3,577	11	2,842
Other	3	590	40	10,694
	1,210	190,912	2,079	431,886
South America:				
Argentina	1,653	226,313	135	33,792
Brazil	128	21,688	38	13,581
Chile	234	37,451	28	6,492
Colombia	1	154	66	15,893
Peru	5	828	9	3,013
Other	(1)	38	19	4,994
	2,021	286,472	295	77,765
Europe:				
Belgium	3,402	558,878	(1)	23
France	10,292	1,598,316	85	19,576
Germany	7,512	1,164,752	122	21,672
Italy	9,046	1,408,985	7	1,659
Netherlands	3,914	618,079	1	237
Sweden	991	156,238	57	19,063
United Kingdom	35,548	5,282,088	1,244	269,897
Other	490	79,125	34	11,000
	71,195	10,866,461	1,550	343,127
Asia:				
China	1	357	21	8,097
India (British)	1,465	238,060	8	2,779
Japan	420	66,049	92	20,757
Philippine Islands	11	2,042	46	10,817
Other			9	2,819
	1,897	306,508	176	45,269
Africa	28	4,088	25	6,039
Oceania, including Australia			71	22,755
	76,351	11,654,441	4,196	926,841

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[1] Less than 1 ton.

Domestic and foreign zinc exported from the United States, 1925–26, by destinations—Continued

Destination	Slabs, blocks, or pigs		Sheets, strips, etc.	
	Short tons	Value	Short tons	Value
1926				
North America:				
Canada	508	$79,772	1,430	$306,756
Cuba	(1)	56	115	28,319
Mexico	72	4,211	204	54,319
Panama	10	1,663	23	5,300
Other	8	1,517	80	16,043
	598	87,219	1,852	410,737
South America:				
Argentina	1,468	221,031	198	64,748
Brazil	38	7,235	65	22,423
Chile	471	69,249	22	7,728
Colombia	1	224	67	15,502
Peru	5	876	14	4,390
Other	(1)	104	45	11,977
	1,983	298,719	411	126,768
Europe:				
Belgium	1,207	192,698	(1)	77
France	4,660	743,159	74	18,594
Germany	3,639	544,944	86	18,582
Italy	1,922	294,166	7	1,781
Netherlands	896	129,192	7	1,411
Soviet Russia	678	104,470	----------	----------
Sweden	392	63,758	30	10,638
United Kingdom	15,913	2,296,942	1,798	396,292
Other	235	36,653	35	10,866
	29,542	4,405,982	2,037	458,241
Asia:				
China	(1)	38	53	14,694
India (British)	829	130,797	7	2,484
Japan, including Chosen	9,700	1,397,499	147	34,572
Philippine Islands	4	685	45	11,210
Soviet Russia	229	33,759	(1)	77
Turkey	34	5,646	----------	----------
Other	----------	----------	9	3,311
	10,796	1,568,424	261	66,348
Oceania, including Australia	1	327	80	24,873
	42,920	6,360,671	4,641	1,086,967

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[1] Less than 1 ton.

CONSUMPTION

APPARENT CONSUMPTION OF PRIMARY SLAB ZINC

Primary zinc consumed in the United States, 1917–1926, in short tons

	1917	1918	1919	1920	1921
Supply:					
Stock Jan. 1—					
In bonded warehouse	90	32	----------	----------	----------
At smelters	17, 508	53, 689	41, 241	36, 793	71, 037
Production	669, 573	517, 927	465, 743	463, 377	200, 500
Imports, foreign	257	35	70	15	6, 739
Imports, domestic, returned	----------	----------	----------	8, 162	731
Total available	687, 428	571, 683	507, 054	508, 347	279, 007
Withdrawn:					
Exports, foreign, from warehouse	64, 680	20, 069	12, 256	28, 132	1, 256
Exports, foreign, under drawback	1, 588	6, 337	4, 533	237	130
Exports, domestic	153, 796	80, 244	129, 508	85, 898	3, 569
Stock Dec. 31—					
In bonded warehouse	32	----------	----------	----------	131
At smelters	53, 689	41, 241	36, 793	71, 037	70, 321
Total withdrawn	273, 785	147, 891	183, 090	185, 304	75, 407
Apparent consumption	413, 643	423, 792	323, 964	323, 043	203, 600

	1922	1923	1924	1925	1926
Supply:					
Stock Jan. 1—					
In bonded warehouse	131	80	80	(1)	----------
At smelters	70, 321	16, 810	27, 808	20, 754	13, 080
Production	354, 277	510, 434	517, 339	572, 946	618, 422
Imports, foreign	52	21	25	24	22
Total available	424, 781	527, 345	545, 252	593, 724	631, 524
Withdrawn:					
Exports, foreign, from warehouse	3, 471	7, 080	(2)	(2)	(2)
Exports, foreign, under drawback	1, 298	----------	----------	----------	----------
Exports, domestic	30, 032	45, 863	[2] 76, 241	[2] 80, 547	[2] 47, 561
Stock Dec. 31—					
In bonded warehouse	80	80	(1)	----------	----------
At smelters	16, 810	27, 808	20, 754	13, 080	26, 937
Total withdrawn	51, 691	80, 831	96, 995	93, 627	74, 498
Apparent consumption	373, 090	446, 514	448, 257	500, 097	557, 026

[1] 998 pounds.
[2] Foreign exports included under domestic exports.

CONSUMPTION OF SLAB ZINC IN HOT GALVANIZING

Statistics of the output, by the hot process, of galvanized sheets, galvanized formed products made from iron or steel sheets, and galvanized wrought-iron and steel pipe are gathered by the American Iron and Steel Institute from all the manufacturers of these products and are published yearly. Other classes of galvanized products, such as wire, barbed wire, cast and forged products, and nails, spikes, and bolts, are not taken into statistical account by the institute. As described on pages 1071–1072 of Mineral Resources for 1918, Part I, a fairly close estimate can be formed of the quantity of zinc used in coating these reported products, and though it represents only a part of the total zinc consumed in galvanizing, a comparison of the yearly figures gives a good idea of the relative condition of the galvanizing industry. Statistics for the principal galvanized products are given in the following table:

Galvanized sheets, pipe, etc., produced in the United States and zinc used in galvanizing them, 1922–1926, in short tons

	1922	1923	1924	1925	1926
Galvanized iron and steel sheets [1]	1,054,996	1,182,431	1,114,480	1,269,556	1,394,237
Galvanized formed products [1,2]	82,857	82,871	77,951	89,110	77,286
Galvanized pipe [1]	436,957	512,865	508,501	614,395	589,233
	1,574,810	1,778,167	1,700,932	1,973,061	2,060,756
Zinc used (estimated) [3]	189,000	213,000	204,000	237,000	247,000

[1] From annual statistical reports of American Iron and Steel Institute.
[2] Articles formed or stamped from iron or steel sheets and galvanized after shaping.
[3] Estimated as indicated above.

CONSUMPTION OF SLAB ZINC BY USES

The largest use of slab zinc is in galvanizing, but another large use is in making brass, and a considerable quantity is rolled into sheet zinc. For a number of years the quantity of slab zinc thus consumed has been estimated by W. R. Ingalls, formerly in the Engineering and Mining Journal and subsequently in the Yearbook of the American Bureau of Metal Statistics. The estimates for a few years are given below.

Estimated consumption of slab zinc in the United States by uses, 1919–1926, in short tons

Year	Galvanizing	Brass-making	Sheet zinc	Other purposes [1]	Total
1919	163,000	155,000	55,000	29,000	402,000
1920	192,000	144,000	53,200	35,000	424,200
1921	138,100	75,000	30,400	19,000	262,500
1922	205,400	145,000	53,500	36,000	439,900
1923	235,200	175,000	55,800	49,000	515,000
1924	240,000	155,000	61,000	56,000	512,000
1925	283,000	165,000	71,100	60,000	579,100
1926	290,000	180,000	86,300	66,000	622,300

[1] Includes zinc used for the manufacture of French oxide, lithopone, atomized zinc dust, die castings, slush castings, and for the desilverization of lead.

PRICES AND VALUE

The average quoted price of prime western zinc at St. Louis was 7.4 cents a pound in 1926 as compared with 7.6 cents in 1925, according to figures published in the American Metal Market. The quotation of 8.75 cents, January 4 and 5, was the highest quotation of the year. The lowest quotation of the year was 6.72½ cents, quoted at the end of April and again in May. During the summer months the quotation ranged from 6.95 to 7.57½ cents. The average price for that period was 7.31 cents. By the middle of September the price had risen to 7.48¾ cents but fell immediately to 7.46¼ cents, and during the remaining months of the year there was a gradual decline, ending with a quotation of 6.97½ cents December 31.

Average monthly quoted price of zinc at St. Louis, 1922–1926, and at London, 1926, in cents a pound[1]

Month	St. Louis (for immediate delivery)					London,[2] 1926
	1922	1923	1924	1925	1926	
January	4.71	6.96	6.42	7.76	8.45	8.26
February	4.50	7.25	6.76	7.51	7.84	7.82
March	4.65	7.87	6.49	7.34	7.34	7.40
April	4.91	7.32	6.13	7.00	7.01	7.06
May	5.10	6.72	5.78	6.96	6.82	6.96
June	5.35	6.05	5.79	7.00	7.12	7.22
July	5.77	6.09	5.90	7.22	7.42	7.39
August	6.24	6.35	6.18	7.59	7.39	7.41
September	6.56	6.46	6.19	7.77	7.42	7.45
October	6.85	6.30	6.33	8.33	7.31	7.42
November	7.14	6.36	6.80	8.72	7.22	7.25
December	7.12	6.25	7.38	8.71	7.04	7.13

[1] American Metal Market, monthly review section.

[2] Conversion of English quotations into American money based on average monthly rate of exchange, as recorded by the Federal Reserve Board of the Treasury.

Average weekly quoted prices of 60 per cent zinc concentrates at Joplin, Mo., and of zinc of "prime western" and "brass special" grades at St. Louis, in 1926

Week ended—	60 per cent zinc concentrates in the Joplin region (dollars per ton)[1]	Prime western zinc in St. Louis (cents per pound)[2]	Brass special zinc in St. Louis (cents per pound)[2]	Week ended—	60 per cent zinc concentrates in the Joplin region (dollars per ton)[1]	Prime western zinc in St. Louis (cents per pound)[2]	Brass special zinc in St. Louis (cents per pound)[2]
Jan. 2	56	8.70	8.87½	July 3	48	7.19¼	7.27
Jan. 9	56	8.74	8.86¾	July 10	50	7.28	7.34
Jan. 16	56	8.66½	8.80	July 17	50	7.52¾	7.59½
Jan. 23	54	8.37½	8.51	July 24	50	7.47½	7.58
Jan. 30	53	8.04	8.16½	July 31	50	7.47	7.55
Feb. 6	53	8.10	8.17	Aug. 7	50	7.39½	7.47
Feb. 13	50	7.96⅞	8.08	Aug. 14	49	7.32¼	7.40½
Feb. 20	49	7.60½	7.71	Aug. 21	50	7.40½	7.48½
Feb. 27	50	7.70	7.81¼	Aug. 28	50	7.41½	7.50
Mar. 6	48	7.42	7.55	Sept. 4	50	7.43	7.48¼
Mar. 13	48	7.37	7.47½	Sept. 11	50	7.41⅞	7.50
Mar. 20	49	7.42½	7.51¾	Sept. 18	50	7.46¾	7.55¼
Mar. 27	47	7.28	7.39½	Sept. 25	49	7.41	7.45¾
Apr. 3	47	7.13⅛	7.23	Oct. 2	49	7.39	7.43½
Apr. 10	47	7.09¼	7.20¼	Oct. 9	48	7.33	7.37¾
Apr. 17	47	7.09¾	7.20	Oct. 16	49	7.33	7.38¾
Apr. 24	46	6.94½	7.09	Oct. 23	48	7.32¾	7.37¾
May 1	45	6.85¾	6.96¼	Oct. 30	48	7.25	7.30¾
May 8	45	6.77½	6.88	Nov. 6	47	7.21¼	7.26⅞
May 15	45	6.76½	6.86½	Nov. 13	47	7.21½	7.26½
May 22	45	6.87	6.97	Nov. 20	47	7.26	7.31
May 29	45	6.86½	6.94	Nov. 27	47	7.19	7.25
June 5	46	6.98	7.05	Dec. 4	46	7.11¼	7.17¾
June 12	47	7.09¼	7.17	Dec. 11	46	7.00½	7.06
June 19	48	7.18¾	7.27	Dec. 18	46	7.04½	7.10
June 26	48	7.17	7.25¾	Dec. 25	6	7.05	7.10

[1] Joplin Globe, Joplin, Mo.

[2] American Metal Market, monthly review section.

The average selling values of zinc by grades, based on the annual reports made by producers in the years 1917 to 1926, were as follows:

Average price of zinc, 1917–1926, by grades, in cents per pound

	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
Grade A (high grade)	14.0	11.1	8.3	8.4	5.6	6.0	7.1	6.8	7.85	7.65
Grade B (intermediate)	12.7	10.7	7.7	8.3	5.5	6.0	7.1	6.8		
Grade C (select and brass special)	9.4	8.0	7.2	8.2	4.9	5.6	6.7	6.4	7.56	7.44
Grade D (prime western)	9.0	7.9	7.1	8.0	4.9	5.6	6.7	6.4		
All grades	10.2	9.1	7.3	8.1	5.0	5.7	6.8	6.5	7.6	7.5
Prime western, average spot quotation at St. Louis	8.9	8.0	7.0	7.8	4.7	5.7	6.7	6.3	7.6	7.4

RARE METALS

By Frank L. Hess [1]

COBALT

In 1926, as in a number of preceding years, the United States produced no cobalt and consumption was represented more or less closely by imports. During the last 10 years imports have been as follows:

Cobalt ore, cobalt, and oxide imported for consumption in the United States, 1917–1926

Year	Ore		Cobalt		Oxide		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
1917	(1)	(1)	223,794	$369,950	276,406	$275,821	500,200	$645,771
1918	(1)	(1)	504,391	628,099	208,596	291,699	712,987	919,798
1919	17,045	$2,832	60,511	141,450	131,424	184,751	208,980	329,033
1920	13,039	4,794	143,603	326,864	202,724	399,605	[2] 359,586	[2] 731,277
1921	7,657	3,235	38,442	105,539	164,003	342,426	210,102	451,200
1922	5,195	7,075	126,364	321,396	217,530	435,895	[3] 349,089	[3] 764,366
1923	58,719	56,326	225,639	552,434	258,574	511,903	[3] 542,932	[3] 1,120,663
1924	28,786	37,276	118,952	264,935	226,703	440,898	[3] 374,441	[3] 743,109
1925	34,782	31,320	198,669	422,185	287,265	546,292	[3] 520,716	[3] 999,797
1926	154,468	55,820	387,076	820,873	333,132	632,478	[2, 3] 874,786	[2, 3] 1,509,211

[1] Ore included with cobalt; not separately recorded until July, 1918. From July to December, 1918, imports are recorded as follows: Ore, 220,115 pounds, valued at $55,188; metal, 250,920 pounds, $498,316.

[2] Includes 220 pounds of zaffer, valued at $14, in 1920, and 110 pounds, valued at $40, in 1926. Imports of zaffer not separately recorded for 1917 and 1918, and none imported 1919 and 1921 to 1925.

[3] Also 11 pounds of "other salts and compounds," valued at $26, imported Sept. 22 to Dec. 31, 1922. Not separately classified prior to change in tariff. Similar additional imports in 1923 were 45,644 pounds, valued at $27,356; in 1924, 797 pounds, $856; in 1925, 13,256 pounds, $7,894; and in 1926, 37,342 pounds, $21,647.

Cobalt compounds imported for consumption in the United States, 1924–1926

	1924		1925		1926	
	Pounds	Value	Pounds	Value	Pounds	Value
Linoleate	40	$22	3,258	$1,196	2,522	$952
Sulphate			9,780	5,951	34,466	20,163
Other salts	757	834	218	747	354	532
	797	856	13,256	7,894	37,342	21,647

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[1] Figures on imports and exports compiled by J. A. Dorsey, of the Bureau of Mines, from records of the Bureau of Foreign and Domestic Commerce.

Cobalt and cobalt ore imported into the United States, 1924–1926, by countries

[General imports]

Country	1924		1925		1926	
	Pounds	Value	Pounds	Value	Pounds	Value
Australia	12,786	$12,709	21,952	$1,413		
Belgium					259,738	$597,496
Canada	112,752	251,332	178,450	387,413	274,347	264,441
Germany			39	85	7,454	14,731
Jamaica			500	1,250		
United Kingdom	22,200	38,170	9,310	19,881		
	147,738	302,211	210,251	410,042	541,539	876,668

During the year, as in 1925, the Belgian, Canadian, and British operators continued their close control of the supply and price of cobalt. The Belgian supply is obtained from veins carrying cobalt, copper, and iron sulphides, near Elisabethville, Katanga, Belgian Congo. The Canadian supply is derived from cobalt arsenides and arseno-sulphides accompanying silver in the veins of the Cobalt district, Ontario. Part of the British supply is mined from cobalt arseno-sulphide veins in the Cloncurry district of Queensland, and the remainder is saved as a by-product from nickel ores mined near Sudbury, Ontario, and treated by the Mond process at Clydach, Wales.

The price was held through the year at $2.10 and $2.20 for the black oxide, $2.25 to $2.35 for the gray oxide, and about $2.50 per pound for the metal, until August, when the quotation for metal rose to $3 per pound. The London quotations were 8s. for black oxide, 8s. 10d. for gray oxide, and 10s. per pound for metal through the year, except that in August a quotation for gray oxide was given by the Engineering and Mining Journal as a penny less, 8s. 9d. These were lucrative figures that probably could be cut heavily should occasion require. The Belgian company's and possibly another company's supply could probably be sold with good profit at half the fixed price.

Like bismuth, cobalt is found in small quantities at many places and in large quantities at very few places.

The chief use of cobalt is in the making of stellite, the corrosion-resistant group of alloys made of cobalt and chromium to which tungsten and other metals are added to adapt the properties to particular needs. Magnet steel, tool steels, and corrosion-resistant steels take other quantities of metallic cobalt. Organic cobalt salts are used for driers in paint, and some cobalt is used as pigment in pottery and enamels.

WORLD'S PRODUCTION

The production of cobalt is given from the several producing countries in such indefinite figures that the estimates are not very exact, but from various official reports the following data have been compiled:

World's production of cobalt, 1924–1926, in metric tons

Country	Cobalt-bearing material	1924		1925		1926	
		Gross weight	Cobalt content	Gross weight	Cobalt content	Gross weight	Cobalt content
Australia: Queensland	Cobaltite concentrates, etc	200. 4	[1] 60	91. 4	[1] 27. 4	27. 4	[1] 9
Belgian Congo	Copper-iron-cobalt alloy	976	[1] 273	684	[1] 192	794	[2] 360
Canada: Ontario	Cobalt, alloys, and chemicals	(3)	209. 2	665	246. 1	794	302
Chile	Arseno-sulphide ore	34. 6	2. 1	--------	--------	--------	--------
Germany: Saxony	Cobalt-bismuth-nickel ores	102	[1] 6	145	6. 9	(3)	(3)
		--------	550. 3	--------	472. 4	--------	--------

[1] Estimated. The Belgian Congo alloy is said to carry 28 per cent of cobalt.
[2] Cobalt in metal, oxide, and salts produced at Oolen, Belgium.
[3] Data not available.

MOLYBDENUM

The production of molybdenum in the United States during 1926 again remained in the hands of two companies, the Climax Molybdenum Co., with a mine at Climax, Colo., and the Molybdenum Corporation of America, with a mine in Sulphur Gulch, 7 miles east of Questa, N. Mex. The companies do not wish to have their figures quoted, so the production for the year may not be published.

The molybdenum deposit of the Climax Molybdenum Co. consists of a huge mass of highly brecciated and silicified igneous rocks, partly quartz porphyry, through which are innumerable veinlets carrying tiny flakes of molybdenite. The deposit has been exposed to long weathering, with the result that in the upper part of the deposit about 25 per cent of the molybdenum occurs as molybdite (iron-molybdenum oxide, $2Fe_2O_3.6MoO_3.15H_2O$), a yellow powdery mineral that is difficult to save economically.

The property of the Molybdenum Corporation of America contains a number of narrow irregular veins following faults. The molybdenite was deposited with the veins which later were crushed by further movements of the faults. The ore, although mined in much smaller quantity than the Climax ore, is much richer.

Each company worked its mine throughout the year.

Except for 1926, the production of molybdenum in the United States during the last 10 years is shown in the following table:

Molybdenum in ore and concentrates, produced in the United States, sold in 1917–1926

Year	Pounds	Value	Year	Pounds	Value
1917	350, 200	$195, 350	1922	----------	----------
1918	861, 637	1, 253, 700	1923	22, 667	(1)
1919	297, 926	341, 814	1924	297, 174	(1)
1920	34, 900	17, 207	1925	1, 154, 050	[2] $961, 324
1921	----------	----------	1926	(3)	(3)

[1] Not reported.
[2] Revised estimate by Bureau of Mines; not reported by producers.
[3] Bureau of Mines not at liberty to publish figures.

At the beginning of 1926 molybdenite concentrate carrying 85 per cent MoS_2 was quoted as 65 to 70 cents per pound for the contained MoS_2. By the first of April the price had dropped to 55 cents and the required content to 80 per cent MoS_2. In the latter part of October the price had declined to 50 cents and remained at that figure the rest of the year. The year's price at the mine, however, was about 50 cents per pound of MoS_2 on a basis of concentrates carrying 80 per cent MoS_2.

The year 1926, like 1925, showed a considerable increase in the use of molybdenum. This increase has been almost all if not wholly in machine and other steels in which great toughness is desired; 0.25 to 0.40 per cent of molybdenum is ordinarily employed for the purpose.

The production of ferromolybdenum and calcium-molybdenum compounds in 1926 was 2,793,766 pounds, containing 1,010,849 pounds of molybdenum (metal). The ferromolybdenum averaged 58.43 per cent of molybdenum, and the calcium-molybdenum compounds averaged 34.54 per cent. Ferromolybdenum was made at two electric furnaces by two producers and calcium-molybdenum compounds were made at three furnaces by three producers.

The shipments of ferromolybdenum and calcium-molybdenum compounds in 1926, amounting to 2,455,471 pounds, contained 871,676 pounds of molybdenum, and the average value per pound of the contained molybdenum (f. o. b. furnaces) was $1.21, compared with $1.27 in 1925.[2]

IMPORTS

During 1926 the United States imported molybdenum ore containing somewhat less than 7 tons of molybdenum. The imports since 1918 are shown in the following table:

"Molybdenum ore[1] (steel-hardening)" imported for consumption in the United States, 1918–1926

Year	Pounds	Value	Year	Pounds	Value
1918, July to December[2]	140, 222	$123, 924	1923[3]	16, 671	$13, 115
1919	106, 743	77, 572	1924[3]	10, 379	9, 038
1920	15, 639	9, 707	1925[3]	1, 954	1, 793
1921	29, 783	20, 471	1926[3]	13, 397	11, 175
1922	412, 221	90, 015			

[1] 1918–1922, recorded as molybdenum ore; 1923–1926, recorded as molybdenum content of ore.
[2] Not separately classified prior to July, 1918.
[3] Classification under tariff of Sept. 22, 1922, "Molybdenum ore and concentrates (molybdenum content)."

Besides the molybdenum in ore, 604 pounds of molybdenum as metal and powder and in ferromolybdenum, valued at $987, was imported in 1926.

WORLD'S PRODUCTION

The accompanying table gives the world's production of molybdenum in 1925 and such data as are obtainable for 1926. The table has been compiled from available official reports.

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[2] Figures compiled by H. W. Davis, of the Bureau of Mines.

World's production of molybdenum ores and concentrates, 1925–26

Country [1]	Mineral	Ore	Concentrates	Per cent MoS_2	Contained molybdenum	Value
1925		*Metric tons*	*Metric tons*		*Metric tons*	
Austria	Wulfenite	(2)	[3] 12.6		8.4	(2)
Australia:						
New South Wales	Molybdenite	(2)	6	[4] 80	2.9	$7,958
Queensland	do	(2)	3	[4] 80	1.4	1,309
Victoria	do	1,175	35	84	17.6	26,777
Canada	do	(2)	14	72.65	6.6	11,176
Chosen	do	(2)	54	80	25.9	5,547
Norway	do	(2)	153	78.30	71.9	194,759
United States	do	88,600	1,076.8	72.7–85	523.5	[5] 961,324
1926						
Austria	Wulfenite	(2)	(2)	(2)	(2)	(2)
Australia:						
New South Wales	Molybdenite	(2)	(6)	(2)	(2)	199
Victoria	do	(2)	43	84	21.7	35,721
Canada	do	(2)	11	83.21	5.5	10,472
Chosen	do	(2)	41	80	19.7	4,926
Norway	do	(2)	145	80	69.6	129,541
United States	do	(7)	(7)	(7)	(7)	(7)

[1] In addition to the countries listed, Mexico is a producer of molybdenite, but data of output are not available for the years under discussion.

[2] Data not available.

[3] MoO_3 contained in ores.

[4] Estimated.

[5] Revised estimate.

[6] Less than one-half ton.

[7] Bureau of Mines not at liberty to publish data.

NICKEL

As has been noted frequently, the United States possesses no nickel deposits of sufficient size and richness to compete with the deposits now worked in Ontario, and it probably could not produce enough nickel for its present use if the price were doubled or even trebled

The only nickel now produced in this country is a small quantity saved as a by-product in the electrolytic refining of blister copper. The blister copper made from the sulphide ores carries minute quantities of nickel which accumulate in the electrolyte of the electrolytic refineries and are finally obtained from it as hydrous nickel sulphate ($NiSO_4.7H_2O$), known in the nickel-plating industry as "single salt," or hydrous nickel-ammonium sulphate ($NiSO_4.(NH_4)_2SO_4.6H_2O$), known as "double salt."

In 1926 three companies saved 2,986,334 pounds of the two salts containing, with a quantity of nickel saved as such, a total of 646,391 pounds of nickel, valued at $234,558. The production of nickel during the last 10 years is shown in the accompanying table:

Nickel content of nickel salts and metallic nickel produced in the United States as a by-product in the electrolytic refining of copper, 1917–1926, and from mixed ores in 1919 and 1920

Year	Short tons	Value	Year	Short tons	Value
1917	402	$331,556	1922	208	$133,191
1918	441	401,000	1923	100	71,605
1919 [1]	511	434,485	1924	191	114,903
1920 [1]	365	293,250	1925	272	169,664
1921	111	86,000	1926	323	234,558

[1] Including nickel produced from copper-lead-cobalt-nickel ores mined in Missouri.

According to quotations in the Engineering and Mining Journal, the year 1926 started with ingot nickel at 34 cents a pound, shot nickel at 35 cents, and electrolytic nickel at 38 cents. Within a week prices rose a cent a pound on each brand and remained at that level to the end of the year.

Figures collected by John P. Dunlop show the production of secondary nickel—that is, nickel recovered after being used—to have been as follows during the last six years:

Secondary nickel recovered as metal and in nonferrous alloys and salts in the United States, 1921–1926, in short tons

Year	Nickel recovered			Year	Nickel recovered		
	As metal	In nonferrous alloys and salts	Total		As metal	In nonferrous alloys and salts	Total
1921	86	859	945	1924	114	2,126	2,240
1922	104	1,408	1,512	1925	191	2,109	2,300
1923	177	1,373	1,550	1926	485	2,565	3,050

The imports and exports of nickel are shown in the following tables:

Nickel imported for consumption in the United States, 1917–1926

Year	Nickel, nickel ore and matte, nickel oxide, and alloys of nickel with copper, etc.		Manufactures and nickel sheets and strips	Total value
	Pounds	Value		
1917	75,526,767	$9,617,163	$45,248	$9,662,411
1918	73,207,147	11,520,826	115,243	11,636,069
1919	36,565,462	8,334,564	90,451	8,425,015
1920	48,492,270	10,657,523	200,464	10,857,987
1921	4,400,453	1,220,347	107,155	1,327,502
1922	14,919,408	3,945,309	110,176	4,055,485
1923	40,670,189	6,602,096	94,832	6,696,928
1924	36,918,980	6,132,984	70,755	6,203,739
1925	43,071,073	7,772,320	98,761	7,871,081
1926	45,529,987	9,409,567	65,166	9,474,733

Nickel imported for consumption in the United States, 1924–1926, by classes

Class	1924		1925		1926	
	Pounds	Value	Pounds	Value	Pounds	Value
Unmanufactured:						
Nickel ore and matte (nickel content)	11,333,251	$1,063,084	9,912,145	$1,062,844	14,635,651	$1,303,003
Nickel alloys, pigs, bars, etc.	24,683,882	4,949,655	31,876,710	6,532,495	29,408,950	7,865,493
Nickel oxide	901,847	120,245	1,282,218	176,981	1,485,386	241,071
Manufactured:						
Nickel or German silver in sheets, strips, and rods	20,113	4,548	7,565	4,369	6,476	4,743
All other manufactures of nickel	145,785	66,207	123,681	94,392	42,293	60,423
	37,084,878	6,203,739	43,202,319	7,871,081	45,578,756	9,474,733

Nickel exported from the United States, 1924–1926, by classes

Class	1924		1925		1926	
	Pounds	Value	Pounds	Value	Pounds	Value
Nickel Monel metal and other alloys	1, 915, 456	$565, 911	2, 569, 185	$834, 529	1, 598, 538	$428, 820
Manufactures	446, 183	203, 854	529, 906	360, 628	(1)	575, 048
Nickel or German silver in bars, rods, or sheets	250, 769	73, 372	492, 964	135, 906	1, 539, 480	336, 265

[1] Quantity not recorded.

The United States receives some nickel from New Caledonia, the French island in the South Pacific Ocean, where the metal is found as hydrous nickel-magnesium silicate of two types, known as garnierite and noumeite. Both are varieties of genthite. The New Caledonian nickel is handled by the United States Nickel Co., a subsidiary of the Société des Hauts-Fourneaux, Paris, France, which has a plant for the reduction of matte at New Brunswick, N. J. However, by far the larger part of the nickel used in the United States, as in the rest of the world, comes from Sudbury, Ontario. Two companies mine virtually all of the nickel produced in Canada—the International Nickel Co., the main office of which is at 67 Wall Street, New York, N. Y., and the Mond Nickel Co. (Ltd.), the head office of which is at 39 Victoria Street, London, SW1, England. The latter company has a branch known as the American Nickel Co., at Clearfield, Pa. The International Nickel Co. is much the largest concern in the nickel business.

As Canada is our mainstay in nickel, the following items on the Sudbury production, given by W. R. Rogers and A. C. Young,[3] will probably be found of interest:

> Mining and smelting operations for the last pre-war year, the year of maximum output, and also the past four years, are noted in the following table:

Schedule	1913	1918	1923	1924	1925	1926
Ore raised tons	784, 697	1, 643, 040	1, 187, 354	1, 411, 980	1, 264, 748	1, 322, 050
Ore smelted do	823, 403	1, 559, 892	1, 140, 160	1, 307, 694	1, 258, 849	1, 309, 782
Bessemer matte produced do	47, 150	87, 184	58, 084	65, 943	70, 280	78, 643
Nickel content of matte do	24, 838	45, 886	31, 029	34, 638	36, 596	39, 038
Copper content of matte do	12, 938	23, 843	15, 769	18, 490	19, 636	24, 159
Matte exported do			21, 450	26, 565	32, 397	34, 908
Matte refined in Canada[a] do		5, 334	31, 765	37, 613	38, 567	33, 489

[a] Refining in Canada began at Port Colborne, Ontario, in 1918, and at Deschêsnes, Quebec, in 1920. The plant at the latter place closed in July, 1924.

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[3] Preliminary Report on the Mineral Production of Ontario in 1926: Ontario Dept. Mines, Bull. 60, 1927, pp. 16–17.

Nickel-copper refining, 1925–26

Schedule	1925	1926
Matte treated tons	38, 352	33, 489
Nickel oxide marketed pounds	11, 329, 713	7, 644, 808
Metallic nickel recovered do	31, 765, 325	25, 627, 602
Blister copper and electrolytic copper recovered do	19, 140, 089	17, 713, 530
Gold recovered [1] ounces	4, 016	4, 447
Silver recovered [1] do	134, 390	151, 429
Platinum metals recovered [1] do	16, 980	19, 495

[1] Includes recoveries by the Mond Nickel Co. at Clydach in Wales.

Details regarding precious metals recovered during a five-year period by refineries treating Ontario nickel-copper matte are noted below:

	1922, ounces	1923, ounces	1924, ounces	1925, ounces	1926	
					Ounces	Value
Gold [1]	2, 094	3, 574	4, 125	4, 016	4, 447	$91, 362
Silver	50, 239	100, 982	122, 889	134, 390	151, 429	90, 980
Platinum	4, 802	6, 810	9, 181	8, 692	9, 471	918, 720
Palladium	6, 862	8, 511	8, 923	7, 856	9, 790	626, 530
Rhodium, ruthenium, osmium, and iridium	124	304	593	432	234	14, 012
Total platinum metals	11, 788	15, 625	18, 697	16, 980	19, 495	1, 559, 262

[1] Includes small recoveries of the rhodium group by the Mond Nickel Co.

The production of nickel and copper in 1926 was less than in 1925 for reasons that are well set out in the annual report of the International Nickel Co.

Net earnings of the company were $5,556,267 for the year, or an increase of $28,783 over 1925. The following abstracts are from the discussion of the situation by Robert C. Stanley, president of the company:

"Sales of metallic nickel were less than during 1925, due principally to a falling off in exports to Europe. There was also a decline in domestic sales of nickel in final quarter of 1926, compared with last quarter of 1925. This apparent loss of business was due to heavy purchases of nickel by consumers for stock in fall of 1925, presumably anticipating price increase of January 1, 1926. Buying of this character was not in evidence in the fall of 1926, as there was no price advance on contract renewals for 1927 deliveries.

"During recent years, particularly in 1926, large quantities of nickel-steel armor and deck plate scrap, resulting from the disarmament program, were consumed by alloy-steel makers. Substitution of this scrap for metallic nickel made inroads into sales of nickel for alloy-steel making. There is every evidence that the bulk of this domestic scrap has been used and that normal consumption of metallic nickel by steel companies may be expected in the near future.

"Sales of mill products, both monel metal and rolled nickel, increased substantially in volume and more than offset the loss of foreign and domestic nickel sales."

Mining, smelting, refining, and development at the Frood mine were referred to as follows:

"Mining and smelting operations at Copper Cliff were continuous throughout the year. Bessemer matte was produced at lower cost than during any previous year. An electrolytic department at Port Colborne, projected in 1925, was completed and is now economically producing a large tonnage of high-purity nickel. Changes in furnace and converter practice have enabled your operatives to further reduce costs. The refinery was run continuously throughout the year at a rate regulated to meet consumption and to avoid an undue accumulation of metal stocks.

"Your management has been actively engaged in initial stages of development of Frood mine, where diamond drilling has developed further large reserves of high-grade ore. To complete this shaft, erect the permanent surface plant, and develop the ore body sufficiently for mining operations will require several years and involve a substantial capital expenditure. It is the intention to bring this mine into production during the ensuing five years. By following this policy, the Creighton mine ore reserves will be available for an increasing output of Monel metal for many years and the Frood ore, which carries much higher precious-metal values than Creighton ore, will be refined for nickel. With its present refining process your company will recover the platinum metals from the Frood ore and in consequence will derive additional profit from this operation."

The chief uses of nickel are said to be about as follows:

	Per cent
Nickel steel (little of which is armor plate)	37
White metals	17
Anodes	23
Miscellaneous (including alloys)	23

In somewhat greater detail the uses are given as follows by the International Nickel Co.:

Nickel steel.—Containing about 3½ per cent of nickel (and also 5 per cent), used for structural purposes; bridge members, gun and ordnance forging, automobile gears, shafts, and axles, and for heat-treating and carbonizing.

Nickel-chromium steels.—Containing from 1 to 3 per cent of nickel, ½ to 1½ per cent of chromium, and used in the heat-treated or carbonized condition for automobile forgings and gears; similar steels are used for armor plate and armor-piercing projectiles.

High-nickel steels or ferronickel alloys.—Containing 25 to 35 per cent of nickel, often together with chromium, for electrical-resistance wire, for noncorrodible parts; containing 36 per cent of nickel, as "invar."

Cupro-nickel.—Containing 15 per cent of nickel and 85 per cent of copper. Used for bullet-jacket stock.

Constantan.—Containing 45 per cent of nickel, 1 per cent of manganese, and 54 per cent of copper; used for electrical-resistance wire and for pyrometers.

Nickel silver.—Containing from 5 to 30 per cent of nickel, used for forks and spoons, for keys, watchcases and ornamental stampings, fittings and castings generally.

Coinage bronze.—Containing 25 per cent of nickel; the United States nickel coin.

Plater's anodes.—For nickel electroplating.

Nickel sulphate and nickel-ammonium sulphate.—Single and double salt; used in preparing electroplater's nickel solutions.

Malleable nickel.—Rods, sheets, strips, tubes, wire, gauze, filter cloth, etc., used for coinage, spark-plug points, in electric-light bulbs, and for cooking utensils and chemical apparatus; also for valve trim.

Cast malleable nickel.—Used for heat-resisting castings, rabble shoes, and for cast cooking utensils.

Nickel-chromium alloys.—Containing from 50 to 85 per cent of nickel and used principally for electrical-resistance wire as a heat-resisting material, for carbonizing and annealing boxes.

Miscellaneous alloys.—In cast light-aluminum alloys, particularly for die castings (2 to 4 per cent nickel); in nickel-bronzes for valves and quality castings (1 to 10 per cent nickel). Silicon-nickel shot for tumbling and burnishing.

Nickel carbonate and nickel formate.—Used in preparation of reduced nickel for catalytic hardening of oils (Sabalier and Senderens process).

The world's production of nickel in 1925 and 1926, as gathered from official reports, is shown in the table following:

World's production of nickel, 1925–26, in metric tons

Country	1925				1926			
	Ore		Matte		Ore		Matte	
	Total	Nickel content	Total	Nickel content	Total	Nickel content	Total	Nickel content
Canada	[1] 1,142,003	(2)	63,757	[3] 33,462	[1] 1,188,208	(2)	71,343	35,414
Germany: Saxony	[4] 145	(2)			(2)	(2)	(2)	(2)
Italy	200	6						
New Caledonia	86,550	5,409	4,820	3,711	100,364	5,269	5,039	3,880
United States			[5] 1,181	247			[6] 1,354	[7] 293

[1] Ore smelted.
[2] Data not available.
[3] Includes 263 tons of nickel contained in cobalt ore.
[4] Cobalt-bismuth-nickel ore.
[5] Hydrous nickel sulphate.
[6] Hydrous nickel sulphate and nickel-ammonium sulphate.
[7] In addition to content of sulphate, figures include a quantity of nickel saved as such.

TANTALUM

Columbite, mined in the United States, shipped in 1918–1926 [1]

Year	Pounds	Value
1918	4,500	$2,250
1919	300	90
1920	4,000	1,450
1921	3,400	1,150
1922	600	240
1923	1,350	$540
1924	1,197	598
1925		
1926	2,100	650

[1] For several years prior to 1918 there was no market for tantalum or columbium minerals, and they were therefore not produced.

No imports of tantalum or tantalum ores were recorded for 1917 to 1919, 1922, or 1924. For other years in the decade 1917 to 1926 imports have been recorded as follows: 1920, 60 pounds of "ferro-alloys (tantalum)," valued at $54; 1921, 1,229 pounds of "ferro-alloys (tantalum)," $788, and 6,785 pounds of "steel-hardening ores (tantalum)," $1,327. Beginning with 1923 the classification is "Ores of ferro-alloying metals (tantalum)," and the figures are as follows: 1923, 5,600 pounds, $3,031; 1925, 5,022 pounds, $1,347; 1926, 350 pounds, $149.

TITANIUM [4]

During 1926 two plants in the United States were operated for rutile and ilmenite—that of Buckman & Pritchard (Inc.), at Mineral City, 4 miles south of Pablo Beach, Fla., and that of the American Rutile Co., at Roseland, Nelson County, Va.

At the first-named plant the beach sands are worked primarily for ilmenite, but rutile, zircon, monazite, and colored sand are saved as by-products. At the other place a syenite is quarried and milled for rutile, and ilmenite is saved as a by-product.

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[4] Titanium was treated somewhat more fully in Mineral Resources for 1925.

The production of titanium minerals in the United States during the last 10 years, so far as the data are available to the Bureau of Mines for publication, is given in the table following. The quantities shown are largely for shipments rather than direct production. Zircon shipments are also given, as the mineral is mined in connection with titanium minerals.

Titanium minerals and zircon produced in the United States, 1917–1926

Year	Titanium minerals					Zircon shipped	
	Rutile concentrates		Ilmenite concentrates		Value	Short tons	Value (estimate)
	Short tons	Percentage of TiO_2	Short tons	Percentage of TiO_2			
1917	206	93	1,339	53–55	$45,637	------	------
1918	261	95	1,644	53–55	57,750	------	------
1919 [1]	102	94–96	106	48–50	22,520	------	------
1920	277	94–96	268	50	(2)	------	------
1921	------	------	------	------	------	------	------
1922	310	95	5,181	52–54	(2)	10	$1,150
1923	270	95	6,270	52	(2)	153	21,420
1924	------	------	4,769	52	[3] 76,300	281	39,340
1925	46	95	5,566	52	[3] 100,000	624	87,360
1926	[4] 30	95	[4] 4,813	52	[3] [4] 84,500	1,292	180,880

[1] Virginia production only; information regarding Florida not available for publication.
[2] Bureau of Mines not at liberty to publish values.
[3] Arbitrary value.
[4] Figures for Florida only. Bureau of Mines not at liberty to publish figures for Virginia.

In the past ten years titanium has assumed an importance wholly different from that toward which most efforts had been directed. Formerly attempts were directed largely toward using it as an alloy for steel, but now its greatest use appears to have been found in the production of white pigments. Titanium oxide is used directly as a pigment, especially in the cellulose paints, but most of the titanium pigment has a foundation of titanium dioxide on which is precipitated barium sulphate, and the resultant material is mixed with a zinc pigment. For pigments, ilmenite carrying nearly the theoretical content of TiO_2 is preferred.

The price of rutile (92 to 95 per cent TiO_2) during the year was 10 to 15 cents a pound. Prices of ilmenite concentrates were a matter of bargaining, and no market price could be said to exist, but what buying and selling took place was probably at prices between $10 and $20 per short ton for material carrying 50 to 52 per cent TiO_2.

Ilmenite is known to have been imported from Senegal (west Africa) and probably from other places, but such imports are not separately tabulated by the Customs Service. Under the title "Ferrotitanium and titanium" 50,941 pounds of material, valued at $9,189, was imported. There was also imported 81,604 pounds of titanium potassium oxalate, valued at $12,232.

The world's production of titanium minerals in 1925 and 1926, according to the data obtainable from official statistics, is shown in the following table. The data for 1926 are very incomplete.

World's production of titanium minerals, 1925–26, in metric tons

Country	Mineral	Metric tons	Content of TiO_2	
			Per cent	Metric tons
1925				
Brazil	Ilmenite	1,500	53	795
Canada: Quebec	do	3,609	[1] 35	1,263
India	do	332	52	173
Norway	do	4,162	41	1,706
	Rutile	52	92	48
Portugal	Ilmenite	3	[1] 50	2
Senegal	do	181	48	87
United States	do	5,049	52	2,625
	Rutile	42	95	40
		14,930	45	6,739
1926 [2]				
Brazil	Ilmenite	[3] 1,498	[1] 53	794
Canada: Quebec	Titaniferous iron ore.	181	[1] 35	64
United States [4]	Ilmenite	4,366	52	2,270
	Rutile	27	95	26

[1] Estimated.
[2] Data very incomplete.
[3] Exports.
[4] Shipments from Florida only. Bureau of Mines not at liberty to publish figures for Virginia.

TUNGSTEN

GENERAL CONDITIONS

The tungsten market, not only in the United States but throughout the world, was dominated, as it has been since 1918, by Chinese wolframite, and no American mines could have operated without the high duty of about 200 per cent which has been in force since September 22, 1922. The duty is 45 cents per pound of contained tungsten, or $7.14 per short-ton unit and $7.99 per long-ton unit (the unit most used in imports).

UNITED STATES

American production was equivalent to 1,382 short tons of concentrates carrying 60 per cent of WO_3 (but actually ranging from 30 to 72 per cent), valued at $920,400. Of the production 90 tons was wolframite, 232 tons was ferberite, 15 tons was hübnerite, and 1,045 tons was scheelite. The tungsten production of the United States during the last 10 years has been as follows:

Concentrated tungsten ores (reduced to equivalent of 60 per cent WO_3) produced in the United States, sold in 1917–1926, and average price per unit

Year	Short tons	Value	Average price per unit	Year	Short tons	Value	Average price per unit
1917	6,144	$6,783,000	$18.40	1922	--------	--------	--------
1918	5,061	7,049,300	23.24	1923	241	$144,600	[1] $10.00
1919	327	353,900	18.02	1924	[2] 565	[2] 287,000	8.47
1920	216	101,800	7.86	1925	1,191	755,500	10.57
1921	--------	--------	--------	1926	1,382	920,400	11.10

[1] The output of 1923 was made by one company only, which sold to its owners at a price considerably above the market.
[2] Includes 191 tons produced in 1919, sold in 1924 for $87,000.

California.—In California the Atolia Mining Co. continued to produce scheelite from its deposits at Atolia, San Bernardino County. The company's claims cover part of a slope which drains across the scheelite veins toward a playa called "Cuddeback Lake." On this slope is débris that has been carried down by torrential rains which are extremely rare, but were probably more common in Pleistocene or more recent time when Lake Lahontan and many smaller lakes occupied the undrained valleys of the Great Basin region of California, Nevada, and Utah. The débris shows little water-wearing and carries fragments of scheelite which weigh as much as 5 or 6 pounds—whence the area is called the "spud patch."

A jigging plant, furnished with four Bunker Hill jigs, two Overstrom tables, screens, and dewaterers, was erected during the year.

The gravel is dug with a 1-cubic-yard Gas-Air Erie shovel and hauled to the jigs by auto trucks. The hutch product is passed over the tables and yields a black-sand and scheelite concentrate; the scheelite is obtained by merely passing the concentrate over a 40-mesh screen.

About one-fourth of the recovered scheelite is saved by hand picking and three-fourths by the jigs.

Water is hauled by rail about 50 miles from Hinckley, and much ingenuity has been exercised to handle it savingly. The coarse tailings are removed by drags and carry 15 per cent moisture. The fine tailings are settled in tanks and are discharged with 50 per cent moisture.

On the property is a large quantity of old mill tailings which carry about 1.5 per cent of WO_3, and many experiments have been made on their reworking.

At present prices there is work for a number of years left at this greatest of vein tungsten mines.

The Tungsten Products Co. continued work on its contact-metamorphic deposit 45 miles northwest of Bishop. The ore is of very low grade (0.5 to 1.0 per cent WO_3), and considerable difficulty attends mining in the rough, high country (11,000 feet altitude). Heavy snows stopped mining on November 29.

Nevada.—Scheelite was mined in Nevada by the Nevada-Massachusetts Co. from contact-metamorphic deposits in the Eugene Mountains, 11 miles north of Mill City, and the company was the largest American producer of tungsten during the year.[5]

The General Tungsten Co. mined scheelite from a deposit near Mina, and C. W. Poole shipped scheelite concentrates recovered from dumps of the mills at Toy and on the east side of the Nightingale Mountains.

Arizona.—In Arizona some scheelite was produced from the Huachuca Mountains, and a little hübnerite was produced from the placers near Dragoon and the veins at Las Guigas.

Colorado.—In Colorado ferberite was produced near Nederland, Boulder County, by the Wolf Tongue Mining Co., the Tungsten Production Co., and the Molybdenum Corporation of America. The Wolf Tongue Mining Co. had done extensive prospecting for two years and found good ore toward the end of 1926.

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[5] The contact-metamorphic tungsten deposits of the United States are described by Frank L. Hess and Esper S. Larsen in U. S. Geol. Survey Bull. 725, Contributions to Economic Geology, 1921, pp. 245–309.

South Dakota.—In South Dakota the Homestake Mining Co. again mined wolframite from the replacement deposits in the dolomite west of the great open pit of its gold mine, and a mill was erected to handle the ore.[6] The ore carries some gold.

Some ore was also produced from the old Wasp No. 2 mine on Yellow Creek, 2 miles south of Lead, and a little concentrate was shipped by Arthur Wabel of Hill City.

The ore, both at Lead and at Nederland, is difficult to concentrate to 60 per cent WO_3 without excessive loss.

OTHER COUNTRIES

As has already been said, China is the dominant country in the tungsten trade. China can and does supply the larger part of the world's need for tungsten, and the economic pressure is so great in China that no matter what the price, so long as there is a price, she continues to pour her concentrates into the world's markets.

Details concerning production are meager, but it is known that the greater part, if not all, of the concentrates comes from the Province of Kiangsi, and probably all comes from the Shai Wai Shan and Yun Yun Shan districts, both of which are close to Nan-an-fu.[7]

The output is said to come almost wholly from veins, but how long the production can be kept up no one knows. No trained geologist is known to have examined the deposits. Chaotic political conditions are thought to have prevented production in the Provinces of Kwangtung and Kwangsi. According to official reports, shipments from Shanghai in the first nine months of 1926 amounted to 4,388 long tons, probably averaging 67.5 per cent WO_3. This is at the rate of 7,372 short tons of 60 per cent concentrates per year.

From Canton and Hong Kong 426 long tons was shipped from January to June 30, but all was transshipped at Shanghai and is possibly included in the figures from that port. On the other hand, it is officially reported that China shipped an equivalent of 8,800 short tons of 60 per cent concentrates during the year.

It is reported that Burma and the lower Malay Peninsula can produce tungsten ores at present prices only as a by-product or as a coproduct of tin mining. During 1926 India's exports, which are virtually those of Burma, amounted to 1,562 long tons, for which the value is given as 2,164,223 rupees, or, with the rupee at 36.327 cents, $786,197. If the ore carried 65 per cent of WO_3, the exports were equivalent to 1,895 short tons carrying 60 per cent of WO_3. These figures indicate shipments larger than had been thought probable, and some ore may have come from unknown private stocks. In 1925 the production was 772 long tons, but a total of 1,561 long tons that had been pooled and held under Government control was also shipped. Fifty tons remained to be shipped early in 1926.

Of the 1926 exports, 1,140 tons went to the United Kingdom, 259 to Germany, and 163 to other countries.

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[6] For descriptions of the replacement deposits in the dolomite near Lead, see Irving, J. D., Economic Resources of the Northern Black Hills: U. S. Geol. Survey Prof. Paper 26, 1904, pp. 158, 163-169; Hess, Frank L., "Tin, tantalum, and tungsten deposits of South Dakota"; Contributions to Economic Geology; 1908: U. S. Geol. Survey Bull. 380, 1909, pp. 131-163; Runner, J. J., and Hartmann, M. L., The Occurrence, Chemistry, Metallurgy, and Uses of Tungsten, with Special Reference to the Black Hills of South Dakota: South Dakota School of Mines Bull. 12, 1918, pp. 67-76.

[7] W. F. Carman, letter dated Jan. 21, 1927.

Australia has been unable to mine much ore at prevailing prices.

An advertisement in a New York paper in November offering 50 tons of concentrates per week from Porto Rico caused considerable interest until it was found that no tungsten ore was available from the island.

Earlier in the year similar interest was aroused by cables from Singapore to the principal dealers, in which offers of large tonnages of high-grade concentrates at a low price were made. Immediately cabled acceptances met with no response.

WORLD'S PRODUCTION

The world's production of tungsten, as shown by the ores shipped or marketed, from 1917 to 1926, so far as statistics are available, is given in the following table compiled by L. M. Jones, of the Bureau of Mines, from official reports.

World's production (as shown by sales or exports) of tungsten ore, 1917–1926, by metallogenic provinces and political areas, in metric tons of concentrates containing 60 per cent of WO_3

Province and area	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
ASIA										
Japo-Korean province:										
Japan	763	629	574	170	------	------	------	------	------	(1)
Chosen (Korea)	919	1,100	197	5	(2)	14	(1)	(1)	(1)	(1)
Chino-Malayan province:										
China	1,361	10,577	2,654	4,712	2,657	3,873	4,554	3,398	6,708	7,989
Tonkin (Indo-China)	433	378	284	284	452	112	129	150	189	(1)
Burma and Shan States	4,226	4,138	3.623	2,983	673	1,038	960	814	849	(1)
Siam	726	231	258	137	76	------	(2)	------	------	10
Unfederated Malay States	334	1,156	808	296	12	258	393	214	251	234
Federated Malay States	837	391	480	257	60	104	41	107	174	99
Netherland East Indies	8	7	------	161	80	------	10	165	27	(1)
Indian province: India (excluding Burma)	68	44	1	------	------	------	------	------	------	(1)
	9,675	18,651	8,879	9,005	4,010	5,399	6,087	4,848	8,198	(1)
AUSTRALIA										
Australian province:										
Queensland	471	357	344	119	5	4	------	1	5	1
Northern Territory	252	280	278	245	------	19	1	------	------	------
New South Wales	268	279	237	39	------	------	2	10	8	------
Victoria	28	5	3	9	------	------	------	------	------	------
South Australia	(2)	------	------	------	------	------	------	------	------	------
Tasmania	286	440	379	209	12	21	116	64	207	98
Western Australia	1	6	8	3	------	------	------	------	------	------
	1,306	1,367	1,249	624	17	44	119	75	220	99
OCEANIA										
Oceanic province: New Zealand	235	170	146	47	46	------	15	18	36	15
SOUTH AMERICA										
Cordilleran province:										
Argentina	1,085	614	204	182	52	125	144	137	4	(1)
Bolivia	4,215	3,703	2,161	766	174	9	------	(3)	82	59
Peru	427	256	139	77	2	------	------	------	5	------
	5,727	4,573	2,504	1,025	228	134	144	137	91	(1)

(1) Data not available. (2) Less than one-fourth ton. (3) Less than one-half ton.

World's production (as shown by sales or exports) of tungsten ore, 1917–1926, by metallogenic provinces and political areas, in metric tons of concentrates containing 60 per cent of WO_3—Continued.

Province and area	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
NORTH AMERICA										
Southwest American province:										
Mexico	308	239	103	82	37	------	------	------	------	------
United States	5, 545	4, 578	297	196	------	------	219	513	1, 080	1, 254
Alaskan province: Alaska	29	13	------	------	------	------	------	------	------	------
Canadian province: Southeastern Canada	(1)	15	------	------	------	------	------	------	------	------
	5, 882	4, 845	400	278	37	------	219	513	1, 080	1, 254
EUROPE										
Scandinavian province:										
Norway	1	2	------	------	------	------	------	------	------	------
Sweden	------	3	30	5	------	------	------	------	------	(1)
Franco-Cornish province:										
England	255	307	177	83	81	3	2	2	1	20
France	261	45	70	23	------	------	------	------	(1)	(1)
Iberian province:										
Portugal	1, 580	1, 150	706	237	306	527	289	304	207	358
Spain	446	534	302	57	25	------	9	161	26	(1)
Italy	1	(1)	(1)	------	7	------	1	------	------	------
Erzgebirge province:										
Germany	295	196	145	45	27	42	40	13	161	(1)
Austria	(4)	(1)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(1)
Czechoslovakia	(6)	(6)	70	48	35	28	28	66	(1)	(1)
Russian province: Russia	126	25	5	(1)	(1)	(1)	(1)	(1)	9	(1)
	2, 965	2, 262	1, 505	498	481	600	369	546	404	(1)
AFRICA										
South African province:										
Southern Rhodesia	11	37	20	17	17	44	------	22	22	------
Union of South Africa	18	37	9	------	------	------	------	------	------	------
Nigeria	(1)	(1)	32	(1)	(1)	(1)	(1)	(1)	(1)	(1)
	29	74	61	17	17	44	------	22	22	(1)
	25, 819	31, 942	14, 744	11, 494	4, 836	6, 221	6, 953	6, 159	10, 051	(1)

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[1] Data not available.
[4] 93,136 tons of ore reported mined; WO_3 content not known.
[5] See under Czechoslovakia.
[6] Included under Austria.

Tungsten ore, ferrotungsten and tungsten metal, tungsten alloys, and tungsten chemicals imported for consumption in the United States, 1919–1926 [1]

Year	Tungsten ore and concentrates [1]		Tungsten and ferrotungsten, tungsten chemicals, powder, and acid [1]		Ferrochromium-tungsten, chromium-tungsten, chromium-cobalt-tungsten (W content)		Tungsten-nickel and other alloys of tungsten (W content)	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
1919	18, 816, 000	$6, 261, 190	396, 460	$287, 981	--------	--------	--------	--------
1920	3, 897, 600	779, 593	1, 997, 719	1, 180, 829	--------	--------	--------	--------
1921	3, 227, 840	276, 757	507, 206	180, 371	--------	--------	--------	--------
1922:								
Jan. 1–Sept. 21	3, 301, 760	279, 190	1, 037, 069	380, 732	--------	--------	--------	--------
Sept. 22–Dec. 31	--------	--------	30, 876	13, 254	--------	--------	885	$741
1923	--------	--------	78, 972	25, 907	--------	--------	49	2, 258
1924	--------	--------	132, 987	46, 156	8, 800	$2, 702	71	536
1925	854, 059	206, 326	839, 194	316, 454	396	352	--------	--------
1926	2, 534, 636	566, 996	330, 365	116, 879	18, 795	7, 822	71	417

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[1] Prior to Sept. 22, 1922, imports recorded as ore, alloys, etc.; beginning with change in tariff ,recorded as tungsten content of ore, alloys, etc.

If a loss of 15 per cent of tungsten in smelting be allowed in order to estimate the tungsten concentrates represented by the various tungsten products imported, it is calculated that about 3,095 short tons of 60 per cent concentrates is represented by the total imports. The duty is so high that ordinarily no imports are taken from bond until use is had for them.

Consumption was probably approximately equal to the domestic production (1,382 short tons) plus the imports (3,095 tons), hence the apparent consumption in 1926 was 4,477 tons. There was also used an unknown quantity of tungsten in scrap steel and probably some in mill scale.

PRICES AND STOCKS

Prices during the year ranged from about \$3 to \$4.50 plus duty (\$7.14) per short-ton unit (20 pounds of tungsten trioxide, WO_3). Domestic scheelite sold at \$10.25 to \$11 per short-ton unit.

December 31, 1925, tungsten (metal) in ores, metal, and ferrotungsten in bond amounted to 2,216,706 pounds. December 31, 1926, the quantity was 2,261,984 pounds. No data are given as to what part of the metal was in ore, in metal, or in alloys. A short ton of tungsten concentrates carrying 60 per cent of WO_3 contains 951.72 pounds of tungsten, so that if all were ore the stocks in bond at the beginning of 1926 would be equivalent to about 2,330 tons of 60 per cent ore and at the close about 2,375 tons. Any ferrotungsten or tungsten (metal) in the stock would somewhat increase the equivalent quantity in ore. At any rate, the stock was less than the stock reputed to be held by one British steel company, and yet it probably represents most of the reserve of the whole American steel industry. Private stocks held in the country were unknown but were probably small.

Ferrotungsten.[8]—The production of ferrotungsten in the United States in 1926 was 4,049,761 pounds, containing 3,121,928 pounds of tungsten (metal), an average of 77.09 per cent of tungsten. Ferrotungsten was made at 5 furnaces—4 electric and 1 alumino-thermic—by 5 producers in both 1925 and 1926. The greater part of the ferrotungsten produced in 1926 was made from foreign ores, chiefly from China and Burma.

The shipments of ferrotungsten in 1926, amounting to 3,966,378 pounds, contained 3,063,004 pounds of tungsten, and the average value per pound of contained tungsten was 95 cents f. o. b. furnaces, compared with 93 cents in 1925.

RADIUM, URANIUM, AND VANADIUM

The radium and uranium trade throughout the world was slack during 1926, but the vanadium trade was on much the same scale as in 1925.

RADIUM AND URANIUM

United States.—In the United States mining of uranium ores was confined to a few tons of rich (7 per cent of U_3O_8) carnotite ($K_2O.2UO_3.V_2O_5.3H_2O$) bearing ore used in various appliances for making radioactive drinking water, medicaments, and pads for various human ailments. J. W. Lewis, working deposits near Gateway, Colo., A. W. Balsley, operating in the La Sal Mountains, Utah, and the United States Co. of New Jersey, with mines in Dry Valley, Utah, were the only miners and shippers to report production.

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[8] Figures compiled by H. W. Davis, of the Bureau of Mines.

No radium is known to have been isolated from ore mined or shipped during the year, but the United States Radium Corporation, of 30 Church Street, New York, N. Y., produced a quantity in finishing work at its reduction plant at Orange, N. J.

Belgian Congo.—So far as is known, no radium ore was mined from the great deposits of the Union Minière du Haut-Katanga, at Chinkolobwe and other places near Elisabethtown, Katanga, nor was the radium plant at Oolen, Belgium, in operation. The radium plant is operated by a subsidiary, the Société Générale Métallurgique de Hoboken. As is now well known, the ore carries pitchblende and about a dozen uranium minerals formed from its decomposition. The stock of radium on hand is thought to be large enough to supply the world for several years. The report of the Union Minière du Haut-Katanga says that for the year ended July 12, 1926, 20 grams of radium (Ra) had been marketed.

At present the world's purchases of radium are apparently not more than 25 grams of radium yearly, and the Belgian stock does not move as rapidly as might be wished. The value of the stock is considerable, although hardly comparable to that of the great copper output of the company. A serious consideration, when more than a few grams of radium are stored at any one place, is the danger that those who are in the vicinity may be injured by escaping gamma rays—a danger that is feared more by those who have handled radium in quantity than by those less well acquainted with the element.

Madagascar.—Uraninite, the crystalline form of pitchblende, has been found in Madagascar, but only as a mineralogical curiosity. Betafite, a complex titano-columbo-tantalate of uranium, thorium, and rare earths, found in pegmatites, is the chief radioactive mineral found in the island; it carries 26.60 to 27.15 per cent of UO_3 and 1.12 to 1.30 per cent of ThO_2. To November, 1926, 103.55 metric tons (114.14 short tons) had been shipped. This quantity undoubtedly included some euxenite, a mineral of similar chemical composition that carries much less uranium (4.78 to 12.12 per cent of UO_3) and little or no thorium, and which is also found in pegmatites. From 1923 to the end of October, 1926, 7.5 metric tons (8.3 short tons) of euxenite was shipped. Between 1909 and 1922, 36.9 metric tons (40.7 short tons) of autunite ($CaO.2UO_3.P_2O_5.8H_2O$) and uranocircite ($BaO.2UO_3.P_2O_5.8H_2O$) bearing earth from a Tertiary lake bed was shipped, but the content of U_3O_8 is unknown. Perhaps the whole output of uranium minerals may have contained 7.5 grams of recoverable radium.

Transvaal.—In the report of work done to December 31, 1926, by the Northern Transvaal (Messina) Copper Exploration (Ltd.), announcement was made of the discovery of pitchblende in the company's shaft No. 5, near Messina, in the extreme north of the Transvaal[9] (latitude about 22° 30′ S.; longitude, 29° 45′ E.). The area is about 11° south of the deposits in Katanga. Little is yet known of the occurrence, but it is said to be promising.

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[9] South African Mining and Engineering Journal, vol. 37, Feb. 12, 1927, p. 654.

A little pitchblende has been found in the concentrates from the Rand gold ores but amounts to no more than a mineralogical curiosity.

Czechoslovakia.—The mines at Jachymov (formerly St. Joachimsthal), Czechoslovakia, were worked during the year, but no data concerning production are at hand.

France.—France has two works for the extraction of radium—Société Nouvelle du Radium, Gif (Seine et Oise), and Radium Sarad (Armet de Lisle), 12 Rue Chomel, Paris.

No radium ores are found in France, but betafite is imported from Madagascar, and at one time torbernite was imported from French Indo-China. In the beginning the French plants used carnotite ores from the United States, but dependence has been largely on pitchblende and its weathering products imported from Portugal.

Great Britain.—No uranium ore was mined in 1926 from the South Terras mine, Grampound Road, Cornwall, the only operating uranium mine in England. From 1914 to 1917, inclusive, the mine produced 490 long tons (549 short tons) of ore averaging 1.06 per cent of U_3O_8. No output was made in 1918 or 1919. From 1920 to 1925, 667 long tons (747 short tons) of ore carrying about 2 per cent of U_3O_8 was produced. The figures indicate a radium content of about 3.84 grams.

Only one radium plant is known to exist in Great Britain—the Loch Lomond Radium Works of Wm. Dempster & Son (Ltd.), Balloch, Dumbartonshire, Scotland. The plant was established in 1914 by J. S. MacArthur (Ltd.). The ore used comes mainly from Portugal.[10] At one time the plant used carnotite from the Utah-Colorado fields.

Portugal.—In Portugal no uranium ore was produced in 1926, but 240 metric tons was produced in the Maceira-Guarda region in 1925 and chemically concentrated in Portugal. Part of the concentrates was treated in Portugal and 875 milligrams of radium was isolated. The remainder, 180 kilograms, containing 360 milligrams of radium, was shipped to France. The ore concentrated contained 0.7 to 1.5 per cent or more uranium oxide (U_3O_8). A stock of about 1,600 metric tons of vein material carrying 0.5 to 0.7 per cent of U_3O_8 is on hand.[11] The Portuguese ores are low grade but easy to treat.

Russia.—Although uraninite has been found in the pegmatites of Carelia (the Arctic slope east of Sweden), Russia has no known European uranium deposits of economic importance. In Asia, however, it has considerable deposits of tyuyamunite, the lime carnotite ($CaO.2UO_3.V_2O_5.8H_2O$), in the Tyuya Muyun Mountains of Ferghana, Russian Turkestan. The ores are said to carry about 1 per cent of U_3O_8. Some radium has been isolated from these ores but probably not more than 2 grams.

South Australia.—Work continued during 1926 on the basic pegmatites carrying davidite, uranium-bearing ilmenite, and a little carnotite[12] (the result of weathering), at Radium Hill, 20 miles southeast of Olary and 275 miles by rail northeast of Adelaide, and on the complex materials on Mount Painter, 336 miles in a direct line north and a little east of Adelaide, South Australia. The United Mount Painter Co., N. L., Mount Painter Exploration Co., N. L., and Mount Painter Heights Syndicate, N. L., united to form the Australian Radium Corporation, N. L., with an issued capital of £300,000 and a nominal capital of £400,000.[13] Each of the three original companies received 50,000 paid up and 50,000 contributing shares. The new company bought the plant of the Radium and Rare Earths Treatment Co., N. L., at Dry Creek Station, near Adelaide.

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[10] Fox, Homer S., Trade Com., London, Letter, May 13, 1927.

[11] Letter from Hollis, W. Stanley, Consul General, Lisbon, May 4, 1927.

[12] Mawson, Douglas, Report on the Property of the Radium and Rare Earths Treatment Co., No Liability, at Radium Hill (near Olary, South Australia), Sept. 18, 1924.

Camels and donkeys have been used for moving ore 10 miles from the mines near Mount Painter to a point from which autotrucks carry the ore 78 miles to Copley, on the railroad, 375 miles from Dry Creek.[14]

The country is a desert, and local creeks have had no water in them during the last 11 years. Pasturage was soon gone, making animal transport unsatisfactory, and construction of a road through the hills was started,[15] with State help.[16]

At the east foot of the mountains, 7 miles from the Mount Painter deposits, are Parallana Springs, the only known hot springs in Australia. They are said to be radioactive and are to be exploited as medicinal baths.

WORLD'S PRODUCTION OF RADIUM

An attempt to estimate the world's production of radium is made in the table following. The table is necessarily inaccurate, because for every country much of the output must be estimated. Even in the United States an allowance must be made for ores shipped abroad for which there is no accurate record. For Czechoslovakia no detailed record is known for the period from 1902 to 1909. The record at hand of the Portuguese production is very incomplete, as is that of the Russian. The figures for Cornwall are based on the official statistics of ore production, but are far less than various private estimates.

Estimated world's production of radium

[To the nearest gram]

	Grams		Grams
United States	250	Russia (Ferghana)	6
Belgian Congo	180	Cornwall	4
Czechoslovakia	42	South Australia	1
Portugal	15		
Madagascar	8	Total	[17] 506

With allowance for all possible errors, it seems safe to say that about a pound of radium has been produced, worth, at $70,000 per gram, about $31,750,000, of which half has been produced in the United States.

RESOURCES

Although the Belgians have published no estimates of their radium resources, it has been stated that the ores available at the present price are many times the production already made.

There is probably much more radium minable in the McElmo sandstone of Colorado, Utah, Arizona, and New Mexico than has been mined, but under present conditions and technique it can not be extracted and marketed at much less than $100,000 per gram. Madagascar, Ferghana, Portugal, and South Australia can possibly produce as much radium as they have already produced, at about the same figure as the United States. The possibilities in Czechoslovakia and Cornwall are uncertain.

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[13] Industrial Australia and Mining Standard, vol. 76, p. 97, July 22, 1926.

[14] Broughton, A. C., "Wonders of Central Australia": Industrial Australia and Mining Standard, vol. 75, pp. 37-38, 1926.

[15] Industrial Australia and Mining Standard, vol. 76, p. 321, 1926.

[16] Industrial Australia and Mining Standard, vol. 75, p. 725, 1926.

[17] Approximately 1.1 avoirdupois pounds.

USES

No advances in the uses of uranium or radium are known. Uranium salts are used in a small way in ceramics and glass. Radium is used for cancer and other diseases, but the need for the greatest possible knowledge and technical skill in its application is increasingly apparent. The manufacture and sale of various radioactive pads and salves and of appliances for charging drinking or bathing water with radioactivity have increased considerably. The Bureau of Chemistry (Department of Agriculture) made a nation-wide survey of such preparations and in a press notice issued July 13, 1926, said:

> The products analyzed for content of radium included hair tonics, bath compounds, suppositories, tissue creams, tonic tablets, face powders, ointments, mouth washes, demulcents, opiates, ophthalmic solutions, healing pads, and other preparations in solid, semisolid, and liquid form for which therapeutic value because of alleged radioactivity was claimed. Only 5 per cent of the products analyzed and claimed to be radioactive contained radium in sufficient quantities to render them entitled to consideration as therapeutic agents and then only in certain very limited conditions. Highly exaggerated therapeutic claims obviously designed to mislead the purchaser are being made for many of the products which contain little or no radium. One of the samples examined consisted of a short glass rod coated on one end with a yellow substance and inclosed in a glass bulb. The bulb is designed to be hung over the bed and according to the claims of the inventor causes dispersion of "all thoughts and worry about work and troubles and brings contentment, satisfaction, and body comfort that soon results in peaceful, restful sleep." * * *
>
> The distribution to the general public without discrimination or adequate supervision of highly radioactive products or the devices for rendering water or other substances highly radioactive is of very questionable propriety, since radium in active dosage is potent for harm as well as for good and should be administered with great caution.

The use of radium in hospitals has apparently not decreased, and one hospital which already had 4 grams of radium (Ra) bought 4 grams more during the year.

IMPORTS

Uranium and radium salts imported for consumption in the United States, 1923–1926

Class	1923		1924		1925		1926	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Uranium oxide and salts of ... pounds	5,495	$7,388	12,550	$10,161	19,290	$18,553	53,411	$46,974
Radium salts ... grams [1]	8.7	493,068	8.1	408,146	9.27	462,095	10.97	548,788
Radioactive substances [2] ... grams [1]					(3)	241	(4)	671
	....	500,456	....	418,307	....	480,889	....	596,433

[1] Bureau of Foreign and Domestic Commerce publishes quantities as follows: 1923, 134 grains; 1924, 125 grains; 1925, 143 grains; 1926, 169 grains.

[2] Classified in 1925 as "Bromide of mesothorium and radiothorium."

[3] 11.5 milligrams; recorded by the Bureau of Foreign and Domestic Commerce as 0.1771 grain.

[4] Weight not recorded.

VANADIUM

United States.—Four companies mined and milled vanadium ores in the United States during 1926, and several individuals produced ores which they sold to the larger companies. A total of about 21,600 short tons of ore was mined, containing 1,181,000 pounds of V_2O_5 (661,360 pounds of V) and valued at about $314,000. The total crude fused vanadium oxide isolated was 945,181 pounds, containing 821,112 pounds of V_2O_5 (459,822 pounds of V), valued at $901,556.

The United States Vanadium Co. continued work at the deposit on East Rifle Creek, 11 miles northeast of Rifle, Colo. The ore, a sandstone impregnated with roscoelite and probably some vanoxite, carries an average of 2.50 to 2.75 per cent of V_2O_5 (1.4 to 1.54 per cent of V). The mill at Rifle, to which the ore is hauled for reduction, was enlarged during the year. The assets of the company, including the plant for reduction of the oxide to ferrovanadium at Columbiana, Ohio, were purchased by the Union Carbide & Carbon Co., and possession was taken December 1. Operations are continued under the same name, except that "Company" is changed to "Corporation."

The Utah Vanadium Co., allied with the Pittsburgh Radium Co., mined some ore from its claims on Yellow Cat Wash, about 15 miles southeast of Thompsons, Utah. The company also obtained ores from the Gateway district and Long Park, Colo.; Carizo Mountain, Ariz.; and the La Sal Mountains, Utah. All of these ores carried the obscure vanadium minerals accompanying the carnotite in the McElmo sandstone and contained 4 to 6.60 per cent of V_2O_5 (2.24 to 3.70 per cent of V). The ores were shipped to the oxide plant at Denver, Colo., and the fused oxide was sold to eastern ferroalloy plants.

The United States Co. of New Jersey (not related to the United States Vanadium Co.) mined and milled the same type of ores in Dry Valley, about 40 miles southeast of Moab, Utah, and made a considerable production of roscoelite concentrate, though none was reduced to oxide. The claims lie in a hill on the south side of Dry Valley and carry carnotite, hewettite, and other vanadium minerals, besides roscoelite.

The losses in handling the ores at all plants have been considerable, but much improvement has been accomplished. The fused oxide sold for 75 cents to $1.30 a pound.

At Goodsprings, Nev., efforts were made to work the lead vanadates, but the centrifugal concentrators installed proved inadequate.

Mexico.—An experimental carload of vanadinite and descloizite was shipped from the Ahumada mine, near Ahumada, Chihuahua, to the Vanadium Corporation of America at Bridgeville, Pa. No other shipments are known to have been made.

Peru.—The Vanadium Corporation of America is said to have developed new methods of concentration for its low-grade ores at Minasragra, Peru, and has thus added largely to its reserves of minable ore. The exports for the year were 21,247,935 pounds, valued at $1,024,000, and carried about 11.75 per cent of vanadium, or about 2,497,000 pounds.

Northern Rhodesia.—The Rhodesia Broken Hill Development Co. (Ltd.), which owns the chief vanadium deposits in Northern Rhodesia, issued a special report in February, 1927, in which the occurrences of vanadium on its property are briefly described. The deposits are replacements of dolomite along nearly vertical bedding planes and fissures, and the outcrops form small hills or kopjes. Vanadium is found with lead and zinc ores in eight of the ore bodies and with zinc ores in two others. The vanadium minerals are descloizite (lead-zinc vanadate) and vanadinite (lead-chlor-vanadate). The vanadium minerals have been found to a depth of 225 feet, although sulphides are found within 100 feet of the surface.

In October, 1926, it was estimated that there were reserves of 38,000 tons of vanadium-bearing ore which averaged 8 per cent lead (Pb), 8 per cent zinc (Zn), and 3.5 per cent vanadium pentoxide (V_2O_5)—equivalent to 1.96 per cent vanadium (V)—and contained a total of about 745 tons of vanadium. Of this quantity 35,000 tons was on dumps and carried 7.5 per cent of Pb, 8 per cent of Zn, and 3 per cent of V_2O_5; 1,600 tons of high-grade ore carried 29 per cent of Pb, 15 per cent of Zn, and 12 per cent of V_2O_5; and 1,400 tons of mill products carried 17 per cent of Pb, 13 per cent of Zn, and 6 per cent of V_2O_5. A slag dump of 200,000 tons carried 4.2 per cent of Pb, 18 per cent of Zn, and 1.2 per cent of V_2O_5—a content of 1,344 tons of vanadium.

A pilot zinc plant throughout 1925 handled ore averaging Zn, 30 per cent; Pb, 8 per cent; V, 1 per cent; Ag, 1.1 ounces per ton. A recovery of 89 per cent of the vanadium was made. The company intends to convert the vanadium into ferrovanadium, with an anticipated recovery of 70 per cent and an annual output of 630 tons of ferrovanadium carrying 34 per cent of V. Processes are not disclosed, but patents on them are being sought.

The total Northern Rhodesian production of vanadium ore to the close of 1926 is given as 280.50 tons, carrying about 9.5 per cent of V, or about 27 tons of vanadium, and valued at £73,648 [18]—a value out of proportion to the stated vanadium-and-lead content of the concentrates.

Marriott and Campbell started work during the year on a vanadium deposit near those of the Rhodesia Broken Hill Co. and are said to have contracted for the sale of their output, presumably on a basis of 15 per cent of V_2O_5 (8.4 per cent V).[19]

Transvaal.—Vanadinite or related minerals occur in the Doornhoek and Kaffirs Kraal mines in the Marico district of the Transvaal, and descloizite has been found near Messina in extreme Northern Transvaal, but no production is known to have been made during the year.

British Southwest Africa.—It is said that ores carrying between 100 and 150 tons of elemental vanadium were held in the country back of Otavi, because the miners were unable to make arrangements to have the concentrates shipped. The ore minerals are vanadinite and descloizite. Most of the concentrates are said to go to Germany, but part comes to the United States.

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[18] Rhodesia Chamber of Mines, Bulawayo, annual report for 1926.

[19] South African Mining and Engineering Journal, vol. 37, Sept. 4, 1926, p. 1.

WORLD'S PRODUCTION

The world's production of vanadium contained in ore or concentrates in 1925 and 1926 was apparently as follows:

World's production of vanadium in ores and concentrates, 1925–26

Country	1925		1926	
	Pounds	Value	Pounds	Value
United States — production	[1] 432,000	[1] $231,382	661,360	$314,000
Peru — exports	377,671	306,000	2,497,000	1,024,000
Northern Rhodesia — do	235,200	170,705	50,625	21,860
British Southwest Africa — do	553,000	593,991	255,600	283,498
	1,597,871	1,302,078	3,464,585	1,643,358

[1] Revised figures.

IMPORTS AND EXPORTS

The imports of vanadium ores into the United States are shown by the tables following:

Vanadium ore (steel-hardening) imported for consumption in the United States, 1918–1926

Year	Pounds	Value	Year	Pounds	Value
1918, July to December [1]	1,772,215	$5,333	1923	4,177,115	$229,210
1919	6,026,005	67,846	1924	14,116,596	722,731
1920	20,673,296	1,080,935	1925	4,735,461	339,468
1921	10,307,540	543,061	1926	16,735,040	914,114
1922	611,170	86,776			

[1] Not separately classified prior to July, 1918.

Vanadium ores produced in and imported into the United States, 1925–26

	1925			1926		
	Ore		Value	Ore		Value
	Pounds	Estimated vanadium content (pounds)		Pounds	Estimated vanadium content (pounds)	
Production	26,132,000	[1] 432,000	[1] $231,382	43,200,000	661,360	$314,000
Imports:						
Europe [2]	109,760	10,976	10,643	1,099,840	104,500	46,607
British South Africa	535,034	53,503	68,905	47,040	4,470	3,956
Portuguese East Africa	2,425	242	300	----------	----------	----------
Peru	4,088,242	449,707	259,620	15,588,160	1,831,600	863,551
	30,867,461	946,428	570,850	59,935,040	2,601,930	1,228,114

[1] Revised figures.
[2] Recorded as from Germany for 1925 and from France for 1926; probably both lots were from southern Africa.

Both ferrovanadium and fused vanadium oxide were exported from the United States in 1926, but the quantities are unknown.

FERROVANADIUM [20]

Ferrovanadium was made at three electric and two alumino-thermic furnaces. These were operated by the following firms:

Electro Metallurgical Co., Niagara Falls, N. Y. (electric).
Metal & Thermit Corporation, Jersey City, N. J. (alumino-thermic).
United States Vanadium Co., Columbiana, Ohio (alumino-thermic).
Vanadium Corporation of America, Bridgeville, Pa. (electric).
York Metal & Alloys Co., York, Pa. (electric).

The output was 4,393,863 pounds which contained 36.15 per cent V, a total of 1,588,591 pounds of elemental vanadium.

Shipments from the furnaces amounted to 3,980,230 pounds of ferrovanadium, containing 1,439,504 pounds of vanadium, at an average of $3.28 per pound of contained vanadium, as compared with $3.30 in 1925 and $3.40 in 1924.

TECHNOLOGY

The successful competition of vanadium made from the comparatively low-grade roscoelite ores of Colorado, Utah, and Arizona, which carry from 2.50 to 6.60 per cent of V_2O_5 (1.4 to 3.7 per cent of V) and are mostly of the lower grade, with the vanadium made from much higher grade ores, was the outstanding feature of the year. It has caused a reappraisal of the deposits, with the result that, for a time at least, they will probably cut a larger figure in the market. It has also led to further examination of the leaner and the less plentiful vanadium-bearing minerals and the possibility of their exploitation. There is hope, particularly as such minerals are being treated by two companies, that there will yet be a market for the vanadates of lead, zinc, and copper found in Arizona, Nevada, and New Mexico.

The proposed method of Von Seth for isolating vanadium during the smelting of titaniferous iron ores (referred to in the chapter of this series for 1925) was not put in operation. Kjellberg [21] has proposed to treat such ores by giving them an oxidizing roast, thus simultaneously making a comparatively insoluble iron oxide and an acid-soluble vanadium oxide. Ore from the Kramsta mine of Sweden, carrying 23.4 per cent of Fe, 0.185 per cent of V, 5.34 per cent of TiO_2, 0.044 per cent of P, and 0.39 per cent of S, was concentrated, mixed with fluorspar, ground to 200 mesh, and roasted; then it was leached with sulphurous and hydrochloric acids and the vanadium precipitated with lime. It is claimed that more than 80 per cent of the vanadium can be extracted profitably at present prices.

Much of the fused vanadium oxide put on the market in 1926 was of high quality, and some carried between 90 and 95 per cent of V_2O_5. The high-grade fused oxide is being used as a catalyst in various chemical processes.

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[20] Figures compiled by H. W. Davis, Bureau of Mines.

[21] Kjellberg, B. P. F., "Recovering the vanadium in titaniferous iron ores": Eng. and Min. Jour vol. 123, Mar. 26, 1927, pp. 521–522.

Patent No. 1596483 was issued August 17, 1926, to F. F. Frick, of Anaconda, Mont., for a process by which an acid extract of a vanadium-bearing mineral is mixed with the dry residue from a previous operation on a similar solution, and the mixture is reduced to dryness. This patent presumably evidences an attempt to recover the vanadium known to occur in small quantities in the phosphate rock found in Idaho and adjacent States.

SECONDARY METALS

By J. P. Dunlop [1]

INTRODUCTION

SCOPE OF REPORT

"Secondary metals" are those recovered from scrap metal, sweepings, skimmings, and drosses, and are so called to distinguish them from metals derived directly from ores which are termed "primary metals." The distinction does not imply that secondary metals are of inferior quality, for metals derived either from ore or from waste material vary in purity and in adaptability to use in making certain products. The figures furnished by producers cover seven metals—secondary copper, zinc, lead, tin, antimony, aluminum, and nickel—and are supplemental to those on the primary metals. They are given to enable producers and consumers to form a more comprehensive idea of the quantities of metal available for consumption; in fact, they constitute an essential addition to the figures given in the general reports on the primary metals and will become more essential in the future.

The following remarks by Frederic W. Willard,[2] of the Western Electric Co., in an address to the sixth session of the Institute of Politics, Williamstown, Mass., August 9, 1926, are illuminating with respect to the economics of secondary metal recovery:

> The United States uses about 90,000 tons of primary tin, practically all of which is imported. Thirty-six thousand tons of this are used in the manufacture of tin plate, largely for our food-preserving industries. At present this tin plate, which comes back quickly in the form of sheet-metal scrap, is not usually processed to recover the tin in its metallic form. Most recoveries to-day return tin in the form of a salt known as tin tetrachloride, which has certain important uses in the processing of textiles. With the increase in price level of tin we shall without doubt see better methods devised by the chemist to remove the thin film of tin from the surface of sheet iron and restore it to us for use again in the food-preserving industries. It can be done and is being done on a relatively small scale. The economics of it will bear investigation.
>
> Manifestly there is nothing to be gained by becoming hysterical over this metal situation. Neither by sumptuary legislation nor by social propaganda can we increase the total recovery of the secondary metals in order to save the human race from total extinction. It is purely an economic question to be solved by the chemist, the physicist, and the financier, and they will concentrate their efforts just as rapidly as the reward justifies. Secondary metal recovery must then follow the paths of least economic resistance.
>
> Some particularly important economic metals are to-day used for purposes from which they can never be recovered in the metallic form. To that extent are our resources dissipated. Others are not being recovered to-day and are totally lost because the spread between secondary metal value and primary metal value is too small to pay the cost of collection * * *.

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[1] Figures on imports and exports compiled by J. A. Dorsey, of the Bureau of Mines, from records of the Bureau of Foreign and Domestic Commerce.

[2] Willard, F. W., "The problem of secondary metals in world affairs": Ind. and Eng. Chem., vol. 18, No. 11, pp. 1178–1182.

The lead which is in the paint on the outside or inside of our houses or our furniture will never appear again in the metal market. The high prices of recent years have tended to drive the paint manufacturers out of the lead market, but their consumption is still large. In 1924, 200,000 tons of lead were used in pigments out of a total production of refined lead in the United States of 706,000 tons.

The next two large users are the storage-battery and cable-covering industries, which together consume half of the total domestic production. From the cable industries we can expect a return of the lead to the market as metal in from 15 to 25 years. From the storage-battery industries we can expect a return in an average period of three or four years. As before stated, the high prices of lead have greatly stimulated the secondary recovery from these and other miscellaneous sources which are of little importance comparatively. The storage-battery industry is now the largest single consumer of lead, and its product comes back to the market as metallic lead relatively soon. The secondary refiners have been exploiting this opportunity.

We use about 90,000 tons of tin annually, of which 36,000 tons go into the tin cans which preserve our food and are at present very largely lost to the metal industry. The larger portion of the remaining imports goes into alloys such as solder and bronzes and of course comes back to the market as such. These alloys are recovered by the secondary producers in the same or similar form. The cost of separation of the metals from alloys is still so great that it usually exceeds the spread between scrap value and the primary metal market.

Zinc finds its way back to the secondary market largely through its use in the manufacture of brass. The large manufacturers of brass to-day are rather efficient in their methods of attracting secondary brass back to their mills, and most of it is worked over rather quickly. Zinc in the form of pigments, of course, is permanently lost. In the last few years it has been increasing in importance as a source of white pigments. The market for zinc has been rather the reverse of the market for lead, and this has stimulated the use of zinc pigments wherever possible. However, the future for the world's supply of zinc is not appreciably more roseate than for lead, its situation being much like that of our domestic petroleum supply. The current market in recent years has suffered from very great overproduction. Mineral sources are not by any means inexhaustible. About one-third of all the zinc spelter produced in the United States in 1924 was used for protecting iron from rusting—that is, in the galvanizing process. For practical purposes in the secondary metal industry this zinc is, like the zinc in pigments, a total loss, so that while we are viewing with alarm the depleting lead resources we are overlooking the situation of zinc because in recent years the market has been oversupplied.

As previously indicated, aluminum is the newcomer among the economic metals. It invaded our firesides less than 30 years ago. It is very largely a controlled industry in the United States, and the collection and recovery of secondary aluminum is, by virtue of that fact, rather thoroughly accomplished. A study of the * * * recovery of secondary aluminum, taking into account that the industry is new, reveals that the recovery of secondary metal in proportion to the total primary production is higher than that of the older economic metals.

Antimony * * * is of great importance in our industry to-day * * *. Contrary to the statements made in some statistical compilations, its greatest use at present is in the manufacture of storage-battery plates instead of bearing alloys. The manufacturers of storage batteries would welcome any suitable substitute, and they probably will find one. They have already succeeded in reducing the proportion of antimony to lead in the manufacture of their plates * * *.

Nickel is an important economic metal but can hardly be said to be essential to our present social order. Its value is sufficiently great to stimulate careful recovery of used metal and its alloys. Practically all the nickel in the world comes from the Sudbury district of Canada and is very largely controlled by one producing and fabricating industry * * *.

Few nations, if any, are able to supply themselves entirely from ore sources within their own boundaries. In every crisis which involves a nation with other nations on which it is normally dependent for some essential metal it is immediately thrown back upon its secondary metal resources. Here it is that the chemist and the metallurgist suddenly become key men in the saving of a nation. While they are by profession and by training contemplative rather than combative, they are generally alive to the economic importance of their work in a national crisis. It is therefore hoped that in the future their voices may be heard in national political councils more effectively than they have been heard in the past.

* * * * * * *

The world is not, to our knowledge, growing any metal resources. We have a fixed supply. We can not as yet pick much from the atmosphere, and the earth's skin to a depth of possibly 1 mile is about all we can hope to use. It is the part of intelligent self-interest to encourage the fundamental sciences, to the end that we may use more of the earth's crust, to rotate the use of metals as completely as possible through more complete use of secondary metals, and to discourage the use of metals where they are so degraded or disseminated that secondary recovery is impossible.

RECOVERY OF WASTE MATERIAL

The collection of waste material is an established branch of industry. It involves the collection, sorting, and shipment of waste having an estimated value of more than a billion dollars yearly; it has advanced in honesty, efficiency, and usefulness, and it is growing rapidly. This report covers only a part of the waste metals of certain classes and only a very small part of the wide variety of waste materials that are marketed.

Much of the waste from country collections and small dealers requires careful sorting, and this is not easy to do by visual examination alone when there are so many alloys used in various products. Lower prices primarily are paid for small, unsorted lots of waste metal than for scrap metals that have been carefully sorted and graded at large plants. Every year an increased number of foundries and metal-working establishments carefully segregate all waste made at their plants. The expense of doing this is quickly returned in the better prices obtained for waste metals sold.

An article on conditioning nonferrous metal scrap, published in the American Metal Market, June 9, 1927, quotes an address by Richard C. Daniels, of the Ternstedt Manufacturing Co., before the convention of the National Association of Purchasing Agents at Grand Rapids, Mich., in which he gave a very interesting account of methods of handling nonferrous metal scrap practiced by his company.

Mr. Daniels is credited with saying that the formula for obtaining top prices for nonferrous scrap is nine-tenths conditioning of the scrap before the sale. This is just another way of saying that if scrap material is conditioned properly the mills and smelters will soon notice it and purchasers will give preference to such material. Producers of metal scrap will profit by study of Mr. Daniels's address.

The earlier chapters on "Secondary metals" in Mineral Resources contain much information regarding the collection of waste material. Various trade papers, such as the Waste Trade Journal, Daily Metal Trade, Brass World, American Metal Market, Foundry, Iron Age, Iron Trade Review, Metal Industry, and Daily Metal Reporter, also contain valuable information relating to prices and marketing of scrap metal and drosses and technical information relating to the proper use of old metals.[3]

CLASSIFICATION OF OLD METALS

The classification of old metals drawn up by the metal division of the National Association of Waste Material Dealers (Inc.) (Times Building, New York, N. Y.) and changed from time to time as desirable has become the standard with both dealers and manufacturers all over the United States. The latest classification (Circular I), effective from December 1, 1927, follows:

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[3] Metal Industry, "Value of a business publication": July, 1926, p. 290.

STANDARD CLASSIFICATION FOR OLD METALS, EFFECTIVE FROM DECEMBER 1, 1927

1. *Delivery.*—(*a*) Delivery of more or less on the specified quantity up to 2½ per cent is permissible.

(*b*) If the term "about" is used, it is understood that 5 per cent, more or less, of the quantity may be delivered.

(*c*) Should the seller fail to make deliveries as specified in the contract, the purchaser has the option of canceling all of the uncompleted deliveries or holding the seller for whatever damages the purchaser may sustain through failure to deliver; and if unable to agree on the amount of damages, an arbitration committee of the National Association of Waste Material Dealers (Inc.), appointed for this purpose, to determine the amount of such damages.

(*d*) In the event that buyer should claim the goods delivered on a contract are not up to the proper standard, and the seller claims that they are a proper delivery, the dispute shall be referred to an arbitration committee of the National Association of Waste Material Dealers (Inc.), to be appointed for that purpose.

(*e*) A carload, unless otherwise designated, shall consist of the weight governing the minimum carload weight at the lowest carload rate of freight in the territory in which the seller is located. If destination of material requires a greater carload minimum weight, buyer must so specify.

(*f*) A ton shall be understood to be 2,000 pounds, unless otherwise specified. On material purchased for direct foreign shipment a ton shall be understood to be a gross ton of 2,240 pounds, unless otherwise specified.

(*g*) If, through embargo, a delivery can not be made at the time specified, the contract shall remain valid and shall be completed immediately on the lifting of the embargo, and terms of said contract shall not be changed.

(*g–1*) When shipments for export for which space has been engaged have been delivered or tendered to a steamship for forwarding and through inadequacy of cargo space the steamship can not accept the shipment, or where steamer is delayed in sailing beyond its scheduled time, shipment on the next steamer from the port of shipment shall be deemed a compliance with the contract as to time of shipment.

(*h*) In case of a difference in weight and the seller is not willing to accept buyer's weights, a sworn public weigher shall be employed, and the party most in error must pay the costs of handling and reweighing.

(*i*) When material is such that it can be sorted by hand, consignees can not reject the entire shipment if the percentage of rejection does not exceed 10 per cent. The disposition of the rejected material should then be arranged by negotiations; no replacement of the rejected material to be made.

Upon request of the shipper, rejections shall be returnable to the seller on domestic shipments within one week and on foreign shipments within 30 days from the time notice of rejection is received by them and upon payment by them of 1 cent a pound on material rejected to cover cost of sorting and packing; the seller to be responsible for freight both ways.

2. *No. 1 copper wire.*—To consist of clean untinned copper wire not smaller than No. 16 B. & S. wire gauge; to be free from burnt copper wire which is brittle and all foreign substances.

3. *No. 2 copper wire.*—To consist of miscellaneous clean untinned copper wire, but to be free of hair wire and burnt wire which is brittle.

4. *No. 1 heavy copper.*—This shall consist of copper not less than $\frac{1}{16}$ inch thick and may include trolley wire, heavy field wire, heavy armature wire, that is not tangled, and also new untinned and clean copper clippings and punchings and copper segments that are clean.

5. *Mixed heavy copper.*—May consist of tinned and untinned copper consisting of copper clippings, clean copper pipe and tubing, copper wire free of hair wire and burnt and brittle wire, free from nickel-plated material.

6. *Light copper.*—May consist of the bottoms of kettles and boilers, bathtub linings, hair wire, burnt copper wire which is brittle, roofing copper and similar copper, free from radiators, brass, lead, and solder connections, readily removable iron, old electrotype shells, and free of excessive paint, tar, and scale.

7. *Composition or red brass.*—May consist of red scrap brass, valves, machinery bearings, and other parts of machinery, including miscellaneous castings made

of copper, tin, zinc, and/or lead; no piece to measure more than 12 inches over any one part or to weigh over 60 pounds; to be free of railroad boxes and other similarly excessively leaded material, cocks and faucets, gates, pot pieces, ingots and burned brass, aluminum composition, manganese, and iron.

8. *Railroad bearing.*—Shall consist of railroad boxes or car-journal bearings; must be old standard used scrap, free of yellow boxes, also iron-backed boxes, and must be free of babbitt, also free of excessive grease and dirt.

9. *Cocks and faucets.*—To be mixed red and yellow brass, free of gas cocks and beer faucets.

10. *Heavy yellow brass.*—May consist of heavy brass castings, rolled brass, rod brass ends, chandelier brass, tubing; not to contain over 15 per cent of tinned and/or nickel-plated material; no piece to measure more than 12 inches over any one part and must be in pieces not too large for crucibles; must be free of manganese mixture, condenser tubes, iron, dirt, and excessive corroded tubing; must be free of visible aluminum brass.

11. *Yellow brass castings.*—Shall consist of brass castings in crucible shape—that is, no piece to measure more than 12 inches over any one part; must be free of manganese mixtures, tinned and nickel-plated material, and must be free of visible aluminum brass.

12. *Light brass.*—May consist of miscellaneous brass, tinned or nickel-plated, that is too light for heavy brass; to be free of gun shells containing paper, ashes, or iron, loaded lamp bases, clock works, and automobile gaskets; free of visible iron.

13. *Old rolled brass.*—May consist exclusively of old pieces of sheet brass and pipe free from solder, tinned and nickel-plated material, iron, paint, and corrosion, ship sheathing, rod brass, condenser tubes, and Muntz metal material.

14. *New brass clippings.*—Shall consist of the cuttings of new sheet brass; to be absolutely clean and free from any foreign substances and not to contain more than 10 per cent of clean brass punchings; to be not smaller than one-fourth inch in diameter.

15. *Brass pipe.*—Shall consist of brass pipe, free of nickel-plated, tinned, soldered, or pipes with cast-brass connections; to be sound, clean pipes, free of sediment and condenser tubes.

16. *No. 1 red composition turnings.*—To be free of railroad-car box turnings and similarly excessively leaded material, aluminum, manganese, and yellow brass turnings; not to contain over 2 per cent free iron; to be free of grindings and foreign material, especially babbitt. Turnings not according to this specification to be sold subject to sample.

17. *No. 1 yellow rod brass turnings.*—Shall consist of strictly rod turnings, free of aluminum, manganese, composition, Tobin and Muntz metal turnings; not to contain over 3 per cent free iron, oil, or other moisture; to be free of grindings and babbitts; to contain not more than 0.30 per cent tin and not more than 0.15 per cent combined iron.

18. *No. 1 yellow brass turnings.*—Shall consist of yellow brass turnings, free of aluminum, manganese, and composition turnings; not to contain over 3 per cent of free iron, oil, or other moisture; to be free of grindings and babbitts. To avoid dispute, to be sold subject to sample.

19. *Auto radiators.*—All radiators to be subject to deduction of actual iron. The tonnage specification should cover the gross weight of the radiators.

20. *No. 1 pewter.*—Shall consist of tableware and soda-fountain boxes, but in any case must test 84 per cent tin. Siphon tops to be treated for separately.

21. *Zinc.*—Must consist of clean sheet and cast zinc; also cast batteries, to be free of loose oxide and dross, sal ammoniac cans, and other foreign materials.

22. *Zinc dross.*—Must be unsweated in slabs and must contain a minimum of 92 per cent of zinc.

23. *Tin foil.*—Shall consist of pure foil free of lead compositions and other foreign ingredients and matters.

24. *Electrotype shells.*—Must be hand picked and free of loose dross and chunks of dross.

25. *Scrap lead.*—Should be clean, soft scrap lead.

26. *Battery lead plates.*—Shall consist of dry-battery lead plates; moisture not to exceed 1 per cent; allowance to be made for wood, rubber, paper, and excess moisture.

27. *New sheet aluminum clipping and new aluminum wire.*—Shall consist of new sheet aluminum, cuttings, and new aluminum wire; must be free from oil, grease, and other foreign substances; must be guaranteed not less than 98 per cent pure aluminum and not to contain more than 10 per cent of clean aluminum punchings; to be not smaller than one-quarter inch in diameter.

28. *Old aluminum wire.*—Shall consist of old aluminum wire guaranteed 98 to 99 per cent pure aluminum and must be free from iron cores, insulation, and any other foreign substance.

29. *Alloy sheet aluminum.*—To be sold on specification and sample.

30. *Painted sheet aluminum.*—Shall consist of painted sheet aluminum and must be absolutely free from iron, dirt, or any other foreign substance.

31. *Old sheet aluminum.*—Shall consist of old and manufactured sheet aluminum; must be free from painted sheet aluminum, iron, dirt, and any other foreign substance.

32. *Aluminum castings.*—Shall consist of aluminum castings, free from iron, babbitt, brass, and any other foreign substance; must not exceed 2 per cent of oil and grease; free of pistons.

33. *Aluminum borings.*—To avoid dispute, should be sold subject to sample.

34. *Aluminum foil.*—Shall consist of pure aluminum foil, free from paper and any foreign ingredients.

35. *Babbitt metal.*—Shall contain bearing metal of all kinds; shall not contain scrap hard metal, Allen metal (which is copper and lead alloy), die cast, zinc boxes, or type metal.

36. *Packages.*—Shall be good, strong packages suitable for shipment, and each package shall be plainly marked with separate shipping marks and numbers and with the gross and tare weights so that the packages may reach their destination and their weights can be easily checked.

The specifications of German scrap-metal dealers, issued in Berlin, June 30, 1926,[4] may be of interest to exporters of scrap metals:

The general assembly of the Association of Metal Traders has issued the following revised specifications on scrap metals:

NOTE.—In all red brass and bronze materials 10 per cent of the tin content can be tolerated for antimony and can be added to the tin content.

Old red brass (*machine red brass*).—Must be composed of parts of castings whose alloy is to contain 85 per cent copper plus tin. The tin content may not be under 4 per cent nor the copper content under 78 per cent. The rest may contain lead and zinc.

Marine bronze.—Must be composed of parts of vessels whose alloy contains at least 92 per cent copper plus tin. A lead content up to 2 per cent is permitted.

Heavy brass (*cast brass*).—Must be composed chiefly of cast-brass parts, strong sheet and pipe sections, and must be free from adhering iron. The goods shipped must contain on an average at least 60 per cent copper and 34 per cent zinc.

New hard brass scrap.—Must be composed of waste coming from the working of rolled brass sheet.

Light brass.—Is made of old brass objects, which may be tinned, soldered, and galvanized. It must be as free from iron as possible.

Brass screw filings.—Must contain at least 57 per cent copper. The rest of the alloy is to be chiefly zinc.

Brass pipe.—Must not be tinned and must be as free as possible from dirt and boiler scale; 2 per cent dirt and boiler scale are allowed. Condenser pipes may be shipped only if they are free of tin.

Brass cartridges.—Must be clean and in one piece, free of powder and iron. They must not have any oxidation to speak of.

Prime block brass.—Must contain at least 64½ per cent copper. The rest is to be zinc, yet the presence of foreign bodies in the alloy is permitted up to 5 per cent harmful content of nickel, manganese, and aluminum. Prime block brass must be filed and show a greenish yellow color in the cracks.

Fire-box copper.—May be derived only from old locomotive fire boxes and must not contain any manganese copper. Not more than 10 per cent of the shipment may contain loose rivets or bolts.

Heavy copper.—May be composed only of old heavy copper, strong copper waste, and new copper sheet scrap. Only 10 per cent may contain tinned copper.

Old electrolytic copper and electrolytic copper wire.—Must be composed of pure electrolytic copper. Material with solder may not be shipped.

Light copper.—Copper utensils of any kind, mixed copper wire, and light copper scrap may be shipped as light copper. It must be free from iron.

Copper filings.—Must be composed of filings of pure copper and must contain no foreign admixtures.

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[4] Waste Trade Journal, "German scrap-metal dealers issue new specifications": July 19, 1926.

Remelted zinc.—Must be molten out of regular sheets of old zinc and contain at least 96 per cent zinc.

Old zinc.—May not have more than 1 per cent iron.

New zinc scrap.—Must be made of new, clean, solder-free zinc scrap.

Old lead.—Must be mostly composed of soft lead or scrap.

Old soft lead.—Must be made of old lead objects and contain at least 99 per cent lead. Alloys or other admixtures are not permissible.

Block lead.—Must contain at least 97 per cent lead. The rest may be antimony, copper, tin, and zinc, but the last two metals together may not come to more than three-fourths per cent.

Mixed tin.—Must be the properly produced tin-lead alloy and contain at least 54.4 per cent tin, and a content of antimony up to 3.6 per cent and of copper up to 0.15 per cent must be tolerated. Goods must be technically free from iron, arsenic, and zinc.

New clean aluminum sheet waste.—Must be unvarnished, clean, not oxidized, and free from all foreign metals. No aluminum leaf or foil waste must be included, but aluminum wire may be present up to 20 per cent with 98.99 per cent aluminum.

REVIEW OF THE SECONDARY METAL INDUSTRY IN 1926

MARKET CONDITIONS

The most significant feature of the secondary metal trade in 1926 was the continued large expansion in the quantity and value of certain classes of scrap metals and drosses. The recoveries of all secondary metals covered by this report increased in 1926. The total value of each of these metals, except aluminum, was greater in 1926 than in 1925, although the average price of metals, except tin and nickel, was less in 1926. The increase in total value for 1926 was $30,970,200, or 13 per cent, and the increase in total quantity of metals and alloys was 15 per cent. As tin, lead, and antimony continued to bring high prices there was an active demand for white-metal alloys, drosses, battery plates, and mud, all of which were collected in much larger quantities than usual. Although less brass was purchased for export in 1926 than in 1925, supplies of secondary copper and brass were ample and the demand good. More than normal building, scrapping of unprofitable transportation lines, repair programs of railways, and high railway-car mileage created vast quantities of scrap and a big demand for scrap material. The competition between the small secondary smelters and the large smelters was keen, and the consolidation of interests continued.

More scrap and drosses were sold direct to smelters in 1926 than in the previous year, and more scrap was sorted at plants producing the scrap and less at those not operating smelting or refining plants.

The waste-metal trade in 1926 was exceptionally good as regards the amount of material handled but very unsatisfactory as regards profits to most dealers. Vast quantities of scrap and drosses were gathered, treated, and sold, but the margin between high prices and low prices of most metals was much less than for several years and the general trend of prices was downward. Consequently those dealers who depended on speculative buying made little or no profit. As in other lines of business, many consolidations were effected or pending in the waste-metal industry to curb ruinous competition and to provide for better metallurgical practices and cheaper distribution of metals.

There has been considerable discussion by the scrap-metal dealers and smelters regarding the reasons for the many failures in the industry and the small profits made by most dealers. Various opinions have been given, and the following excerpts from an editorial in the Waste Trade Journal of August 6, 1927, call attention to the reasons for such a condition and suggest remedies therefor:

> The inevitable result of cutthroat competition has been and is bankruptcy. * * *. Late developments have been such as to bring one to conclude that unhealthy competition results in ruin for some and losses for almost an entire trade. It has required a long time for a majority in the waste-material industry to become convinced that, because of new conditions, new methods are absolutely necessary in the waste-material business.
>
> Highly speculative markets of the old days have become altogether a thing of the past, and the industry simply must settle down to conducting a general jobbing business wherein orders are taken for merchandise and filled at a profit. During the last three years competition on the buying end of the trade in waste materials has been so keen that dealers' buying prices have in most instances equaled, and in some cases exceeded, their selling prices. The common practice in the trade of following a price set by a competitor has proved to be not alone unprofitable but in some instances ruinous.
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> Paying of prices for waste materials that afford no margin for profit not only endangers the financial position of the dealer who pursues such a policy but serves also to endanger the economic structure of the entire industry in that it has a tendency to discourage trading and also affects the morale of the members of the trade. In former years, when conditions in general in waste materials were far different than they now are, it was regarded quite the proper thing, and nothing unusual, for some dealer to come suddenly into the market and offer exceedingly high prices for certain grades of stock which he desired to speculate on and stock up on for future mill requirements. The tendency of the markets in the old days to fluctuate widely was responsible for "splurge" buying, but under present conditions, with consumers exerting pronounced control through group cooperation, such policy is well-nigh suicidal to the individual or concern practicing it and serves to retard the progress of the industry as a whole.
>
> Developments in the waste-material trade recently bear out these contentions in a most forcible manner. A great many in the trade are paying heavily for a market disturber who was in the habit of paying higher prices for merchandise than market values and circumstances warranted. The facts must be faced by every waste-material dealer. Fluctuations in market prices have narrowed down to very slim ranges. The industry has become a jobbing trade, and the same principles that govern jobbers in coal, wood, flour, steel, hardware, or other commodities must be adopted in the waste-material industry if it is to thrive.
>
> Understand your costs, your overhead, and expense of doing business, and, unless you can foresee a profit in the business offered you by mills or by other dealers, refuse to book the business. It is not fair to yourself or to the other members of your industry to take orders at prices which fail to net a profit. Whereas in former years the high-priced buyer was looked upon as a leader in the industry, to-day, under prevailing market circumstances, he is a menace not only to himself but to those from whom he purchases his material.

Although 1926 showed a record-breaking consumption of scrap iron and steel, as well as of nonferrous metal scrap, fewer yards and plants handled such material. The quantity of copper scrap exported increased but the quantity of brass scrap exported decreased sharply. With the steady increase in scrapping of automobiles, the quantity of battery plates and radiators delivered to smelters increased greatly. Deduction for moisture and separators in battery plates and for sweated radiators caused considerable friction until the difficulties were settled. The makers of composition ingots from scrap were not successful in the endeavor to harmonize their troubles so that a fair profit could be made on their products; consequently much of their output was sold at too close a margin to be very profitable.

There are about 3,300 brass and aluminum foundries in the United States, most of which use scrap metals in part, although the trend of late years has been to buy brass ingots from large manufacturers instead of making them. This practice, however, does not extend to many of the larger users of brass, such as automobile companies and railroad companies, which tend more and more to make their own ingots and to more closely supervise the collection of all waste metal, whether the waste is sold or used in the foundry.

Building has slackened in 1927, and other lines of business have shown a general tendency to slow up, although the consumption of all metals is still large. Vast quantities of scrap metals are returning to trade channels, so that the output of secondary metals will continue to be large in 1927, although the value will not be nearly so great as in 1926. It is hoped that profits will be more commensurate with the volume of sales in 1927 than in 1925 and 1926.

PRICES OF SOME SCRAP METALS AND ALLOYS

The tables that follow show certain scrap-metal prices at New York in 1926 as quoted by the Waste Trade Journal and the American Metal Market.

The dealers' weekly average buying price in New York of heavy scrap copper ranged from 11.90 to 11.65 cents a pound during January, February, and March, 1926. Early in April it was again as high as 11.9 cents but weakened toward the end of the month, and in May and June it ranged from 11.4 to 11.65 cents. The market was much stronger in July, and the month ended with the highest quotation of the year, 12.25 cents. In August prices declined, ranging from 12.2 to 12 cents. There was another decline at the end of September to 11.9 cents, and October prices continued at about this level. The price again dropped in November to as low as 11.5 cents. December prices ranged from 11.4 to 11.25 cents, closing at 11.25 cents, the lowest quotation for 1926.

No. 1 composition scrap (red brass) showed a range of only 0.75 cent a pound in 1926, compared with a range of 1.75 cents in 1925. It was quoted at 9.15 cents in January, was highest at 9.40 cents in August and September, and lowest at 8.65 cents in June.

The price of heavy lead scrap began the year at 8.25 cents a pound, the high point of the year. In December 6.65 cents was paid, the lowest price in 1926. The range during the year was 1.60 cents a pound. The downward trend that began in March continued until the first part of June. Then prices stiffened and the prices quoted up to the middle of September ranged as high as 7.75 cents. The downward trend was then resumed, until 6.75 cents was reached in November. Early in December the quoted price was 6.85 cents, declining before the end of the month to 6.65 cents, the lowest of the year.

The range in the price of scrap zinc in 1926 was 0.85 cent a pound, compared with 1.25 cents in 1925. The price was 5.25 cents a pound early in January and as low as 4.40 cents in October and December. After opening at 5.25 cents in January, the price declined half a cent a pound by the end of the month, followed by an increase to 5 cents a pound the middle of February. During March, April, and May the price ranged from 4.75 to 4.50 cents, and in June, July, August, and September the price fluctuated from 4.50 to 4.65 cents. Prices increased slightly in October, but in November declined to 4.50 cents and in December to 4.40 cents.

The prices of scrap aluminum and No. 12 alloy were variable and declining, and the quotations for scrap-aluminum castings ranged from 20 cents a pound early in 1926 to 14.75 cents in December. New aluminum clippings ranged in price from an average of 22.27 cents a pound in January to 20.52 cents in December.

The price of secondary tin usually followed the trend of price for primary tin, which had a range of 13.5 cents during 1926. Block-tin pipe was quoted as high as 62 cents a pound in December and as low as 49 cents in June.

Antimonial lead scrap, especially old battery plates, was in active demand, owing to the continued strength of antimony prices, although the quotations for both lead and antimony were less in 1926 than in 1925.

Scrap nickel and nickel alloys were in good demand in 1926, and their prices followed closely those for primary nickel, which advanced slightly in January and remained stable during the rest of the year.

Average scrap-metal prices in 1926, in cents per pound[1]

[New York dealers' weekly average buying prices]

Date	Heavy copper	No. 1 composition	Heavy lead	Scrap zinc	Cast aluminum	Date	Heavy copper	No. 1 composition	Heavy lead	Scrap zinc	Cast aluminum
Jan. 2	11.85	9.15	8.25	5.25	20.00	July 3	11.65	9.00	7.25	4.50	17.25
9	11.85	9.15	8.25	5.25	20.00	10	11.65	8.85	7.15	4.50	17.25
16	11.85	9.15	8.20	5.00	19.50	17	11.90	9.15	7.40	4.65	17.25
23	11.65	9.15	8.20	5.00	19.50	24	11.90	9.15	7.50	4.65	17.25
30	11.65	8.90	8.20	4.75	19.50	31	12.25	9.15	7.75	4.65	17.25
Feb. 6	11.75	9.00	8.20	4.90	19.25	Aug. 7	12.20	9.15	7.75	4.65	17.25
13	11.90	9.15	8.20	5.00	19.25	14	12.15	9.15	7.75	4.65	17.25
20	11.85	9.25	8.15	4.90	19.00	21	12.15	9.25	7.65	4.50	17.40
27	11.85	9.15	8.15	4.90	19.00	28	12.00	9.40	7.65	4.50	17.40
Mar. 6	11.90	9.15	7.75	4.65	19.15	Sept. 4	12.15	9.40	7.65	4.50	17.50
13	11.90	9.20	7.65	4.65	19.25	11	12.15	9.40	7.75	4.50	17.50
20	11.90	9.15	7.15	4.65	19.25	18	12.15	9.40	7.40	4.50	17.50
27	11.65	9.15	7.20	4.75	19.25	25	11.90	9.25	7.50	4.50	17.50
Apr. 3	11.65	8.90	7.20	4.75	19.25	Oct. 2	11.90	9.25	7.50	4.50	17.75
10	11.90	9.00	7.15	4.75	19.25	9	11.75	9.25	7.15	4.40	17.75
17	11.75	8.90	7.15	4.65	19.00	16	11.90	9.25	7.00	4.65	17.50
24	11.65	9.15	7.00	4.65	18.50	23	11.90	9.25	7.00	4.65	17.25
May 1	11.65	9.15	6.90	4.65	18.25	30	11.90	9.25	6.85	4.65	17.25
8	11.65	8.90	7.15	4.65	18.00	Nov. 6	11.65	9.00	6.75	4.50	16.50
15	11.40	8.90	6.90	4.65	18.00	13	11.65	9.00	6.75	4.50	16.00
22	11.40	8.90	6.90	4.50	17.75	20	11.65	9.25	6.75	4.50	16.00
29	11.40	8.90	6.75	4.50	17.50	27	11.50	9.25	6.75	4.50	15.25
June 5	11.40	8.65	6.75	4.50	17.25	Dec. 4	11.25	9.25	6.85	4.40	14.75
12	11.40	8.75	6.85	4.50	17.25	11	11.25	9.15	6.75	4.40	14.75
19	11.65	8.75	7.40	4.50	17.25	18	11.40	9.15	6.65	4.40	14.75
26	11.65	9.00	7.25	4.50	17.25	25	11.40	9.15	6.65	4.40	14.75
						31	11.25	9.15	6.65	4.40	14.75

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[1] Waste Trade Journal, New York, Jan. 15, 1927.

The following monthly average scrap-metal prices at New York in 1926 for new scrap-zinc clippings, old zinc, block-tin pipe, and aluminum clippings, in cents per pound, were quoted by the American Metal Market:

Average scrap-metal prices at New York in 1926, in cents per pound[1]

Month	New scrap-zinc clippings	Old zinc	Block-tin pipe	Aluminum clippings
January	5.96	4.87	52.65	22.27
February	5.83	4.54	52.00	21.99
March	5.72	4.31	53.22	21.75
April	5.52	4.02	52.19	21.35
May	5.50	4.00	51.47	21.25
June	5.59	4.09	49.59	21.25
July	5.62	4.12	50.00	21.25
August	5.62	4.12	52.50	21.25
September	5.62	4.12	56.71	21.25
October	5.62	4.12	58.70	21.25
November	5.62	4.12	55.50	21.21
December	5.62	4.12	57.00	20.52
Year	5.66	4.21	53.46	21.38

[1] Metal Statistics, 1927.

SECONDARY METALS RECOVERED

The quantity of the metals contained in numerous alloys made partly or wholly from secondary material can not be ascertained definitely. The figures given as the result of the annual canvass are only approximate, but they constitute the sole available data on an important industry.

The increase in the value of the secondary metals, exclusive of gold, silver, platinum, iron, steel, and ferro-alloys, recovered in the United States in 1926 was due mainly to the much larger recoveries of secondary copper, lead, antimony, and tin.

The quantity of secondary platinum metals recovered in 1926 was 46,137 troy ounces, about 3,000 ounces more than in 1925, and equaled 34 per cent of the platinum metals imported for consumption in the United States in 1926.

The value of the gold and silver contained in old jewelry, dental waste, tableware, ornaments, and other articles remelted or refined in 1926 was $37,305,942. Mints and refineries reported the recovery of 10,000,792 fine ounces of silver and $31,065,448 in gold from waste or discarded material. Jewelry and dental waste furnish the largest supplies of secondary gold and silverware and photographic waste the largest amount of secondary silver.[5] The consumption of silver in chemical and photographic industries in 1926 is estimated at 8,000,000 ounces and that in the arts and industries in the United States at 39,407,600 ounces.

Most of the silver recovered from photographic waste is obtained from solutions and is recovered by the larger makers of films and plates and by the motion-picture industry.[6] Generally these solutions contain less than half an ounce of silver to the gallon. The recovery from waste film is probably 800 ounces to the million feet.[7]

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[5] Hoke, C. M., "Methods of handling gold and platinum wastes": Metal Industry, June, 1927, pp. 240–242.

[6] Weisburg, Louis, Recovery of Silver from Solutions Used in Photographic Work: U. S. patent 1527942, Feb. 24, 1925.

[7] Byers, C. A., "Recovery of silver from movies' laboratory waste": Eng. and Min. Jour.-Press, Aug. 26, 1922, p. 373.

The profits of dealers and brokers in scrap iron and steel were less in 1926 than in 1925, and there were a considerable number of business failures. The dealers paid higher prices than were warranted, for prices steadily declined, so that no margin was left for handling and shipping.

Estimates can be obtained for iron and steel scrap used at furnaces, but no data are available for the large quantities of such material used at the thousands of foundries, some of which use as high as 30 to 40 per cent of scrap metal to make their products. It is estimated that the railways usually supply more than 30 per cent of the scrap iron and steel and that steel and other industrial plants supply nearly as much. There are about 3,000 scrap iron and steel yards in the United States, and more than 5,000,000 tons of ferrous scrap is derived from country and urban collections, mainly from discarded agricultural and household implements and mining, oil, and gas machinery and equipment. This quantity does not include rails, pipe, machinery, and other equipment renovated and sold for the original use, but only such waste as goes to remelters; nor does it include that ferrous scrap which stays within the confines of furnaces and steel mills. The 1926 issue of Penton's foundry list gives the total number of foundries melting brass as 3,316, of which many melt aluminum also. Many of these foundries buy ingots made from new or old metal and sell all their waste. Many others make their own ingots, and most of them use some scrap metals. It is impracticable and unnecessary to segregate the statistics relating to the melting, refining, and use of secondary metals according to States. As most of the large industrial plants and railways which supply the bulk of the waste metals are located in the Eastern and Central States, the larger part of all scrap metals and drosses is smelted and refined in that territory. The proportion of scrap metals treated in the Southern, Rocky Mountain, and Pacific Coast States is comparatively small, although there has been a steady increase in the amount treated in California in recent years, and the recovery of tin and brass is now quite large in San Francisco and Los Angeles.

Secondary metals of certain classes recovered in the United States, 1925–26

	1925		1926	
	Short tons	Value	Short tons	Value
Copper, including that in alloys other than brass	250,600	$71,170,400	281,700	$78,876,000
Brass scrap remelted	242,300	56,270,800	283,000	65,918,000
Lead as metal	112,420	39,477,100	125,000	44,368,000
Lead in alloys	114,460		152,300	
Zinc as metal	61,430	11,359,000	64,570	11,700,000
Zinc in alloys other than brass	13,300		13,430	
Tin as metal	7,950	35,165,400	9,750	42,511,500
Tin in alloys and chemical compounds	23,000		23,650	
Antimony as metal	1	3,794,000	2,910	5,164,400
Antimony in alloys	10,839		13,320	
Aluminum as metal	17,700	24,816,000	20,500	23,868,000
Aluminum in alloys	26,300		23,700	
Nickel as metal	191	1,518,000	485	2,135,000
Nickel in nonferrous alloys and salts	2,109		2,565	
	----------	243,570,700	----------	274,540,900

SECONDARY COPPER

Secondary copper recovered in the United States, 1925–26, and imports and exports of brass and copper scrap, in short tons

	1925	1926
Copper as metal	183,700	200,100
Copper in alloys other than brass	66,900	81,600
	250,600	281,700
Copper from new scrap (not including brass)	50,000	55,000
Copper from old scrap (not including brass)	200,600	226,700
	250,600	281,700
Brass scrap remelted:		
New clean scrap	110,000	125,000
Old scrap	132,300	158,000
	242,300	283,000
Copper content of brass scrap (averaging 70 per cent copper):		
New scrap	79,200	87,500
Old scrap	90,410	110,600
	169,610	198,100
Total secondary copper (including copper content of brass scrap):		
From new scrap	129,200	142,500
From old scrap	291,010	337,300
	420,210	479,800
Brass scrap imported	5,374	4,311
Scrap copper imported	5,214	5,501
Brass ("ingots, scrap, and old") exported	48,189	25,132
Scrap copper exported	6,053	9,713

Of the total quantity of secondary copper recovered in 1926, 112,559 tons (13,379 tons more than in 1925) was recovered by plants refining primary metals and the remainder by plants treating only secondary materials. The copper produced by smelters of secondary material included 87,541 tons of pig copper, 81,600 tons of copper in alloys other than brass, and 198,100 tons of copper in remelted brass. These figures indicate increases of 3,021 tons in pig copper, 14,700 tons in alloys other than brass, and 28,490 tons in remelted brass.

The value of the copper, as metal and in alloys, computed at 14 cents a pound—the average price for the year of all marketable grades of new metal—amounted to $134,344,000.

The imports of scrap brass into the United States, which in 1922 reached the abnormal quantity of 71,962 tons (drawn from surplus war supplies), were only 4,311 tons in 1926. The exports of brass ("ingots, scrap, and old") decreased from 48,189 tons in 1925 to 25,132 tons in 1926, although representatives of foreign smelters competed actively with domestic smelters in the East for waste metals. The decrease was attributed to unwillingness to meet the bids of domestic purchasers at certain periods. This decrease in brass exports partly accounts for the large increase in brass scrap remelted in domestic plants. Scrap-copper exports increased from 6,053 tons in 1925 to 9,713 tons in 1926.

Railways sell or turn in the larger part of their brass and copper scrap and other metal waste to dealers in part payment for new material, but the reports show that the railways utilized in their own shops and foundries more than 7,800 tons of brass in addition to 1,600 tons of copper and 24,700 tons of copper in alloys other than brass. The railway reports, however, frequently include under "brass" alloys that should more properly be designated "bronze."

SECONDARY LEAD

Secondary lead recovered in the United States, 1925–26, in short tons

	1925	1926
Secondary lead recovered by smelters that treat mainly ore	35, 146	32, 499
Secondary lead recovered by smelters that treat only scrap and drosses	77, 274	92, 501
	112, 420	125, 000
Secondary lead recovered in remelted alloys:		
Lead content of antimonial lead scrap treated at regular lead smelters	9, 483	11, 554
Lead content of drosses and scrap alloys treated at secondary smelters	104, 977	140, 746
	114, 460	152, 300
Total secondary lead recovered	226, 880	277, 300

Refined primary lead produced in the United States, 1925–26, in short tons

	1925	1926
From domestic ore	654, 921	680, 685
From foreign ore and base bullion	112, 048	118, 256
Lead content of antimonial lead from foreign and domestic ores and bullion treated at regular smelters	17, 043	19, 831

The total quantity of secondary lead recovered in 1926 was 22 per cent more than in 1925; that recovered as pig lead increased 12,580 tons, although those smelters whose product is mainly primary metal reported a decrease of 2,647 tons. The quantity of lead recovered in or from alloys increased 37,840 tons. Part of the lead was derived from babbitt, solder, type metal, old brass, and white-metal drosses, but the main sources of supply are old pipe, lead cable, battery plates, and lead lining of acid tanks. Regular primary smelters reported the recovery of 11,554 tons of lead in antimonial lead scrap, or 2,071 tons more than in 1925. The automotive and radio industries are among the largest users of secondary lead and antimony. The secondary lead recovered from old batteries probably amounted to one-half of the total lead recovered in alloys in 1926. So many plates are now being remelted that less new pig lead and antimony will be used for batteries in 1927 than old antimonial lead; consequently the quantity of new metals used for such purposes in 1927 will not equal that used in 1926.

The total output of secondary lead in 1926 was equal to 35 per cent of the refined primary lead produced in the United States, compared with 30 per cent in 1925. The recovery of secondary lead was not exceeded by the output of primary domestic lead in any one State.

SECONDARY ZINC

Secondary zinc recovered in the United States, 1925–26, and products made from zinc dross, skimmings, and ashes, in short tons

	1925	1926
Secondary zinc recovered by redistillation	39, 181	40, 799
Secondary zinc recovered by sweating, remelting, etc	22, 249	23, 771
Total zinc recovered unalloyed	61, 430	64, 570
Zinc recovered in alloys other than brass	13, 300	13, 430
Zinc recovered in brass (estimated)	53, 300	63, 000
Zinc dust made from zinc dross	5, 813	4, 889
Zinc dross used for zinc dust (estimated)	6, 850	5, 732
Zinc concentrates and ore exported	68, 951	95, 252
Zinc dross exported	15, 968	10, 461
Lithopone made from zinc skimmings and ashes	48, 705	45, 356
Secondary zinc content of lithopone	9, 741	9, 204
Zinc chloride made from zinc skimmings, ashes, etc	45, 772	43, 106
Zinc content of zinc chloride made from zinc skimmings, etc	10, 070	9, 481
Zinc content of zinc sulphate made from zinc skimmings, ashes, etc	858	603

Secondary zinc recovered as pig metal and in alloys (including brass) showed an increase in total quantity in 1926, but less zinc dross was exported in 1926 than in 1925, and less zinc dust, lithopone, and zinc chloride was made from dross, skimmings, etc. The estimated zinc content of brass remelted in 1926 was nearly 10,000 tons more than that in 1925.

In addition to the 64,570 tons of remelted and redistilled zinc, 45,356 tons out of a total of 167,278 tons of lithopone (a zinc pigment containing approximately 20 per cent of zinc) was made from zinc skimmings and ashes. The zinc content of skimmings and ashes used for lithopone is estimated at 9,204 tons, a decrease of 537 tons from 1925. The quantity of zinc chloride made in 1926 was 51,308 tons, of which 43,106 tons, containing 9,481 tons of zinc, was made from zinc ashes, skimmings, etc. The secondary zinc recovered in zinc sulphate was 603 tons.

The amount of zinc dross exported in 1926 was 10,461 tons, compared with 15,968 tons in 1925.

Two plants in San Francisco are making zinc dust from zinc dross, so that all that material available on the Pacific coast has a good market. About 5,732 tons of dross was used in the United States in 1926 to make 4,889 tons of zinc dust.

The recovery of secondary zinc (including that in brass) in 1926 was 23 per cent of the output of primary zinc in the United States, or 12,970 tons more than in 1925. The American Bureau of Metal Statistics estimates that 290,000 tons of zinc was used in 1926 for zincking sheets, forms, tubes, wire, etc. Only a small part of the zinc used in galvanizing is recovered, although some zinc chloride is made from clippings from galvanized sheets. The zinc content of zinc chloride or zinc sulphate made from galvanized clippings probably exceeded 2,000 tons.

Five smelters—one each in New Jersey, New York, and West Virginia, and two in Pennsylvania—treated zinc drosses and skimmings by means of large graphite retorts of 600 to 800 pounds capacity, instead of by means of the small clay retorts used by smelters treating ore or mixed ore and drosses. A new plant to treat zinc dross was under construction in 1926 at Birmingham, Ala. Zinc drosses and skimmings have many uses, and these create active competition for their purchase. Considerable zinc is recovered by sweating, and the residues are then sold for redistillation. A description of modern practice in producing good zinc from scrap, prepared by E. R. Thews, is given in Metal Industry, February, 1927 (pp. 600–602), and March, 1927 (pp. 107–108). The production of zinc from drosses and skimmings made by smelters by redistillation was 1,618 tons more in 1926 than in 1925.

The zinc recovered in alloys other than brass amounted to 13,430 tons, compared with 13,300 tons in 1925. Of the secondary zinc recovered unalloyed, 63 per cent was obtained by redistillation from drosses and skimmings and the remainder by sweating, remelting, etc.

SECONDARY TIN

Secondary tin recovered in the United States, 1925–26

	1925	1926
Tin recovered as pig tin..........short tons..	7,950	9,750
Tin recovered in alloys and chemical compounds..........do....	23,000	23,650
	30,950	33,400
Clean tin-plate scrap treated at detinning plants..........long tons..	172,432	194,494
Old tin-coated containers treated..........do....	1,167	11,942
Metallic tin recovered at detinning plants..........pounds..	1,932,850	2,292,000
Tin content of tin tetrachloride, tin bichloride, tin crystals, and tin oxide made at detinning plants..........pounds..	4,264,340	4,094,000
Total tin recovered at detinning plants..........do....	6,197,190	6,386,000
Tin tetrachloride, tin bichloride, tin crystals, and tin oxide made at detinning plants..........pounds..	8,626,387	8,634,000
Average quantity of tin recovered per long ton of old tin-coated containers..........pounds..	25	16.74
Average quantity of tin recovered per long ton of clean tin-plate scrap.....do...	35.8	32.7

Tin (metal) and tin concentrates (tin content) imported into the United States, 1925–26, in short tons

	1925	1926
Tin imported as metal..........	85,843	86,418
Tin concentrates (tin content) imported..........	214	339

Although the United States consumed somewhat over 50 per cent of the world's primary output of tin in 1926, the only domestic output was 8 short tons of tin contained in tin concentrates from placer mines in Alaska. The recovery of secondary tin increased from 30,950 tons, valued at $35,165,400, in 1925 to 33,400 tons, valued at $42,511,500, in 1926. The total value assigned is based on the yearly average price (63.64 cents a pound in 1926) given by the American Metal Market for 99 per cent metal, prompt delivery at New York. The secondary recovery in 1926 was equivalent to 39 per cent of the tin imported into the United States as pig metal in 1926 (86,418 short tons). The quantity of secondary pig tin recovered increased 1,800 tons and tin in alloys 650 tons.

Nearly all detinning in the United States is done by the electrolytic process or by the chlorine process. A complete history of the different methods of detinning is given in an article entitled "Scrap detinning affords big outlet for chlorine," by C. L. Mantell, in Chemical and Metallurgical Engineering, August, 1926 (pp. 477–479).

The tin reported recovered in alloys and compounds in 1926 included the tin content of products made in several plants from clean tin-plate scrap. The materials recovered included some tin crystals, tin oxide, and putty powder but consisted mainly of tin tetrachloride and tin bichloride. The production of these compounds is stated together in order to avoid disclosing confidential information. As the products are made from scrap tin and thus conserve the primary metal, they are properly regarded as recovered tin.

The largest recoveries of tin were made from the scruff and drosses that occur in making tin plate and terneplate; they amounted to about 7,200 short tons. The quantity of tin plate and terneplate made in 1926 (according to the American Iron and Steel Institute) was 1,782,306 long tons, or 124,511 tons more than in 1925. The next largest recoveries of tin were in babbitt and solder, scrap, and drosses.

About 3,300 short tons of tin was recovered from clean scrap tin plate, either as pig tin or as tin chloride, tin crystals, or tin oxide. Apparently only about 800 tons of pig tin was recovered from scrap tin (not tin plate), clippings, old tin pipe, tin foil, and collapsible tubes, and it is impossible to give separately the quantities of tin recovered from these sources. A considerable quantity of tin was also recovered from waste tin liquors used in dyeing.

The tin-plate scrap imported in 1926 amounted to 10,886 short tons, nearly all of which came from Canada. A comparatively small quantity of old tin containers was used to make sash weights by remelting in a cupola. No tin was recovered by this process, and the impure metal recovered is not suitable for ordinary castings, being too brittle.

Copper mines, which formerly used tin-plate scrap from canning factories or mixed iron scrap to recover copper from mine waters, now use baled detinned scrap. This scrap costs about $20 a ton, and 1 pound of it is necessary to precipitate 1 pound of copper.

A large quantity of tin was recovered in bronze, and part of the brass remelted contains a little tin and lead, which in the aggregate amounts to a considerable quantity. Other alloys from which secondary tin was recovered were solder, babbitt, pewter, terne metal, and electrotype metal.

Reports received show that the clean tin-plate scrap detinned in 1926 was 22,062 long tons more than in 1925. The average metallic content of the tin oxide was given as 78 per cent, that of the tin bichloride as 24.5 per cent, tin crystals 52.6 per cent, and tin tetrachloride 45.4 per cent.

The relatively small quantity of secondary tin recovered from tin-plate scrap and old tin-coated cans is significantly shown when compared with the quantity of tin used in making tin plate. It is estimated that about 30,000 short tons of tin was used in the United States in 1926 by makers of tin plate and terneplate. The total recovery of secondary tin as metal and in compounds from tin-plate scrap and old cans in 1926 was 3,300 short tons.

A description of the method used in treating old tin-coated cans is given in Mineral Resources for 1919.

New tin-plate clippings were treated at plants of the Vulcan Detinning Co. at Sewaren, N. J., Neville Island, Pa., and Streator, Ill.; by the Johnson & Jennings Co., of Cleveland, Ohio; and at the plants of the Metal & Thermit Co. at San Francisco, Calif., East Chicago, Ind., and Chrome, N. J.

The plants utilizing old tin cans, which can handle 40,000 tons a year, treated only 11,942 long tons in 1926. These plants never received shipments large enough to operate steadily at full capacity, even when the prices of tin and black sheet-metal scrap were high. Most of the old tin-coated containers treated in 1926 were handled at a new plant at Los Angeles, Calif., owned by the Metals Refining Co.

SECONDARY ANTIMONY

Secondary antimony recovered in, primary antimonial lead produced in, and antimony imported into the United States, 1925–26, in short tons

	1925	1926
Secondary antimony in antimonial-lead scrap smelted at regular smelters	1,328	2,550
Secondary antimony recovered at secondary smelters	9,512	13,680
	10,840	16,230
Primary antimonial lead produced at regular smelters	19,667	22,524
Antimony content of primary antimonial lead	2,624	2,693
Antimony imported in ore, as metal, or as oxide or salts	13,182	17,364

The production of secondary antimony in the United States in 1926, most of which was recovered in alloys, aggregated 16,230 tons, an increase of 50 per cent over 1925. The value given in the table on page 286 is based on the average yearly price for ordinary brands of antimony at New York as published by the American Metal Market.

The regular smelters reported the recovery of 2,550 tons of antimony contained in 14,104 tons of antimonial-lead scrap. The total recovery of antimony from secondary sources was nearly as large as the quantity of antimony imported in ore, etc., which amounted to 17,364 tons. Ninety-nine short tons of domestic antimony ore, containing 43 tons of metallic antimony, was produced in 1926. Of the 22,524 tons of antimonial lead produced in 1926, 18,909 tons was produced from domestic ores. The antimony content of antimonial lead varies from as low as 3 per cent to as high as 20 per cent. The average is between 4 and 8 per cent.

The principal materials refined or remelted that contained antimony as an alloy were hard-lead drosses, babbitt, battery plates, solder, pewter, and type metal. Antimony used in the rubber, glass, enamel, paint, and ceramic industries does not yield any secondary recoveries, but nearly all the antimony used in battery plates and type metal eventually comes back for remelting and refining. The quantity of antimony used for coloring rubber and for pigments has materially increased, owing to the higher price of mercury.

Old battery plates and mud are bought at a price based on the price of pig lead at St. Louis on the day of purchase, and the antimonial content is ignored in fixing the price, the antimony content being paid for as lead. Antimony sold as high as 25 cents a pound in 1926, and the average price for the year was 15.91 cents, or 7.91 cents more than that of lead. Antimony has been separated from antimonial lead, but the practice has not been general, and because of the cost and difficulty of separation the old battery plates are usually remelted and marketed as antimonial lead. A book entitled "Systematic Treatment of Metalliferous Wastes," by L. Parry, discusses the refining of soft metals.

SECONDARY ALUMINUM

Secondary aluminum recovered in the United States, 1925–26, in short tons

	1925	1926
Secondary aluminum recovered unalloyed	17,700	20,500
Aluminum recovered in alloys (mainly No. 12)	26,300	23,700
	44,000	44,200

Primary aluminum produced in the United States and imported and exported, 1925–26

	1925	1926
Value of primary aluminum produced in the United States	$36,430,000	$37,583,000
Aluminum (crude and semicrude) imported for consumption pounds	41,997,178	71,391,717
Aluminum (crude and semicrude) exported do	12,642,034	7,634,171

The recovery of secondary aluminum as pig aluminum or in alloys amounted to 44,200 short tons in 1926 and was valued at $23,868,000, compared with 44,000 tons, valued at $24,816,000, in 1925.

Some of the larger secondary smelters, refiners, and users of aluminum in 1926 were as follows:

Aluminum Smelting & Alloys Co., Hamden, Conn.
Apex Smelting Co., Chicago, Ill.
Aurora Refining Co., Aurora, Ill.
Cleveland Electro Metals Co., Cleveland, Ohio.
Federated Metals Corporation, New York, N. Y.
Ford Motor Co., Detroit, Mich.
General Metals Refining Co., St. Louis, Mo.
Globe Metal Co., Chicago, Ill.
W. F. Jobbins Co. (Inc.), Aurora, Ill.
Lewin Metals Corporation, St. Louis, Mo.
Maytag Manufacturing Co., Newton, Iowa.
Michigan Smelting & Refining Co., Detroit, Mich.
National Bronze & Aluminum Foundry Co., Cleveland, Ohio.
National Smelting Corporation, Cleveland, Ohio.
Niagara Falls Smelting & Refining Co., Buffalo, N. Y.
Oberdorfer Brass Co., Syracuse, N. Y.
Peninsular Smelting & Refining Co., Detroit, Mich.
United States Aluminum Co., Cleveland, Ohio.
United States Reduction Co., East Chicago, Ind.
Werra Aluminum Foundry Co., Manitowoc, Wis.

Various products are made by smelters and refiners from scrap aluminum.

A large quantity of No. 12 secondary ingots (92 per cent aluminum and about 8 per cent copper) is made by smelters from old or defective castings, borings, and scrap, as is shown by the fact that the secondary recovery of aluminum in alloys was more than that recovered unalloyed.

Some recent articles relating to aluminum are as follows:

Anderson, Robert J., Smelting secondary aluminum scrap: Metal Industry, January, 1925 (p. 10); September, 1925 (pp. 368–370); February, 1926 (pp. 63–65); May, 1926 (pp. 187–189); November, 1926 (pp. 455–457); July, 1927 (pp. 281–283).

The following articles on aluminum were published in the report for 1919 on secondary metals:

Casting losses in aluminum foundry practice in the United States, by Robert J. Anderson.
Scrap aluminum, by Charles Vickers.
Tentative specifications for aluminum, presented to the American Society for Testing Materials.

Chapter 10 of Metallurgy of Aluminum Alloys, by Robert J. Anderson, published in June, 1926, discusses the character of aluminiferous scrap, the sampling and assay of drosses and borings, the fluxes used in smelting secondary aluminum, practice in smelting aluminum scrap, and impurities in secondary pig aluminum.

SECONDARY NICKEL

Secondary nickel recovered in the United States, 1925–26, in short tons

	1925	1926
Nickel recovered as metal	191	485
Nickel recovered in nonferrous alloys and salts	2,109	2,565
	2,300	3,050

Primary nickel produced in the United States and imported and exported, 1925–26, in short tons

	1925	1926
Nickel produced as a by-product from the electrolytic refining of copper at domestic refineries	272	323
Nickel imported for consumption in the United States as nickel or in nickel ores and matte, oxide, and alloys	21,536	22,765
Nickel, Monel metal, and other alloys exported	1,285	799

The nickel reported as recovered from secondary sources includes nickel in Monel metal but not that in ferrous alloys, and, as nickel is largely used as an alloy in steel and to some extent in iron, it is evident that 3,050 tons of nickel recovered in 1926 forms probably not more than half that recovered and reused. The secondary nickel recovered from nonferrous sources in 1926 was equal to 13 per cent of the imports and was mainly recovered as Monel metal, old anodes, nichrome, and nickel silver.

The use of nickel in brass foundries has become general. The beneficial use of nickel for many purposes in such alloys is set forth in an article published in the Brass World, June, 1926 (pp. 201–202).

Analyses of various nickel alloys were published in Mineral Resources, 1915.[8]

The International Nickel Co., desiring to assist users of Monel metal to dispose of scrap and at the same time to protect the purity of the primary metal, has established a definite procedure in the purchase of Monel scrap. The company has published the following information:

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[8] Hess, F. L., Nickel: Mineral Resources of the United States, 1915, pt. 1, 1917, pp. 763–765.

The mining and smelting operations are located at Copper Cliff, Ontario; the refining and rolling operations are located at Port Colborne, Ontario, and Huntington, W. Va. Monel-metal scrap must enter operations at one of these points. This is decided to a large extent by the purity of the scrap.

Monel metal as produced is held to a close chemical specification. It contains approximately 67 per cent of nickel, 28 per cent of copper, and 5 per cent of other elements. It has in it no lead and no zinc.

If the user has not allowed other materials to become mixed with his scrap it should meet production specification. However, it is not entirely possible to prevent all contamination, and in the purchase of scrap the International Nickel Co. allows a certain tolerance. Therefore scrap within the analysis given below will be purchased at a flat price, which will be quoted on receipt of detailed description of the scrap offered from time to time by the consumer.

Nickel, not less than 64 per cent; copper, not less than 27 per cent; iron, not more than 3½ per cent; sulphur, not more than 0.05 per cent; lead, none; zinc, none.

Provided such scrap does not come within the above analysis, settlement will be made on a basis of copper-nickel content, the price of which will be quoted after sampling and analysis by the International Nickel Co. All scrap will be purchased and settled for on a basis of weight, sample, and analysis.

The cost of sampling and analyzing a shipment of scrap is approximately $35. It is therefore necessary to avoid handling small shipments of scrap if possible, and all consumers are requested to collect their scrap until they have at least 500 pounds before offering it for sale.

GOLD, SILVER, COPPER, LEAD, AND ZINC IN CALIFORNIA

(MINE REPORT)

By James M. Hill [1]

SUMMARY

The total value of the mine production of gold, silver, copper, lead, and zinc in California in 1926 was $20,050,801, a decrease of 14 per cent as compared with 1925. The production of gold declined 9 per cent. The output of silver was 34 per cent less in quantity and 40 per cent less in value than in 1925. Production of copper decreased 29 per cent in quantity and 30 per cent in value. The output of lead increased 23 per cent in quantity and 13 per cent in value as compared with an increase of 38 per cent in quantity and 50 per cent in value in 1925 over 1924. Zinc produced in 1926 was 78 per cent greater in quantity and 76 per cent greater in value than in 1925.

The value of the metals produced from 335 lode mines in 1926 was $14,810,316, a decline of $3,365,000, or 19 per cent, as compared with the output of 332 lode mines in 1925. Gold produced at lode mines in 1926 ($6,695,078) was 16 per cent less and silver (2,003,098 ounces, valued at $1,249,933) was 34 per cent less in quantity and 41 per cent less in value than in 1925. The quantity of ore, tailings, etc., handled at lode mines in 1926 was 1,760,859 short tons, or 9 per cent less than in 1925.

The total value of gold and silver produced by 483 placer mines in California in 1926 was $5,240,485, an increase of 3 per cent as compared with the output of 359 placers in 1925. The placer gold production was $5,228,403, an increase of 3 per cent; the quantity of silver recovered at placer mines was 19,362 ounces, an increase of 4 per cent, but its value ($12,082) was 6 per cent less than that of 1925.

The prices given in the table that follows are those at which the values for metals in this report have been calculated. The silver prices for 1917 and 1919 are dealers' buying price, New York. For 1918, average price as stated by the Bureau of the Mint. For 1920 to 1922, New York market price for domestic silver only. For 1923, average price under the Pittman Act, from January 1 to June 2, for domestic silver; average New York price for all silver after that period. For 1924 and later years, average New York price for bar silver. The copper, lead, and zinc prices are weighted averages, for each year, of all grades of primary metal sold by producers.

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[1] Helen M. Gaylord, of the Bureau of Mines, prepared the statistics for this report.

Prices of silver, copper, lead, and zinc, 1917–1926

Year	Silver	Copper	Lead	Zinc	Year	Silver	Copper	Lead	Zinc
	Per fine ounce	*Per pound*	*Per pound*	*Per pound*		*Per fine ounce*	*Per pound*	*Per pound*	*Per pound*
1917	$0. 824	$0. 273	$0. 086	$0. 102	1922	$1. 00	$0. 135	$0. 055	$0. 057
1918	1. 00	. 247	. 071	. 091	1923	. 82	. 147	. 070	. 068
1919	1. 12	. 186	. 053	. 073	1924	. 67	. 131	. 080	. 065
1920	1. 09	. 184	. 080	. 081	1925	. 694	. 142	. 087	. 076
1921	1. 00	. 129	. 045	. 050	1926	. 624	. 140	. 080	. 075

Mine production of gold, silver, copper, lead, and zinc in California, 1917–1926

Year	Mines producing		Ore, tailings, etc. (short tons)	Gold		Silver	
	Lode	Placer		Fine ounces	Value	Fine ounces	Value
1917	241	249	3, 003, 250	971, 733. 00	$20, 087, 504	1, 775, 431	$1, 462, 955
1918	388	315	2, 503, 411	799, 588. 10	16, 528, 953	1, 427, 711	1, 427, 711
1919	370	280	1, 714, 911	807, 666. 82	16, 695, 955	1, 107, 189	1, 240, 051
1920	301	199	1, 165, 022	692, 296. 70	14, 311, 043	1, 706, 327	1, 859, 896
1921	294	279	1, 215, 600	759, 720. 76	15, 704, 822	3, 629, 223	3, 629, 223
1922	283	282	1, 539, 933	709, 677. 99	14, 670, 346	3, 100, 065	3, 100, 065
1923	268	353	1, 535, 691	647, 209. 75	13, 379, 013	3, 559, 443	2, 918, 743
1924	267	266	2, 019, 200	636, 139. 72	13, 150, 175	3, 555, 133	2, 381, 939
1925	332	359	1, 938, 679	632, 035. 31	13, 065, 330	3, 054, 416	2, 119, 765
1926	335	483	1, 760, 859	576, 798. 40	11, 923, 481	2, 022, 460	1, 262, 015

Year	Copper		Lead		Zinc		Total value
	Pounds	Value	Pounds	Value	Pounds	Value	
1917	48, 153, 139	$13, 145, 807	21, 868, 628	$1, 880, 702	10, 872, 716	$1, 109, 017	$37, 685, 985
1918	47, 674, 660	11, 775, 641	13, 372, 049	949, 415	5, 561, 393	506, 087	31, 187, 807
1919	21, 732, 507	4, 042, 246	3, 568, 267	189, 118	472, 990	34, 528	22, 201, 898
1920	12, 626, 272	2, 323, 234	4, 813, 510	385, 081	1, 165, 509	94, 406	18, 973, 660
1921	11, 743, 404	1, 514, 899	1, 124, 276	50, 592	846, 184	42, 309	20, 941, 845
1922	22, 539, 485	3, 042, 830	6, 312, 536	347, 189	3, 012, 950	171, 738	21, 332, 168
1923	28, 317, 759	4, 162, 711	9, 549, 680	668, 478	----------	----------	21, 128, 945
1924	52, 107, 171	6, 826, 039	4, 763, 806	381, 104	3, 060, 000	198, 900	22, 938, 157
1925	46, 864, 913	6, 654, 818	6, 566, 200	571, 259	11, 489, 237	873, 182	23, 284, 354
1926	33, 466, 299	4, 685, 282	8, 093, 513	647, 481	20, 433, 887	1, 532, 542	20, 050, 801

Gold and silver produced at placer mines in California, 1917–1926

Year	Dredge				Drift			
	Gold		Silver		Gold		Silver	
	Fine ounces	Value	Fine ounces	Value	Fine ounces	Value	Fine ounces	Value
1917	402, 166. 86	$8, 313, 527	24, 747	$20, 392	17, 741. 97	$366, 759	1, 091	$899
1918	359, 519. 46	7, 431, 927	27, 840	27, 840	5, 244. 82	108, 420	575	575
1919	373, 305. 95	7, 716, 919	25, 740	28, 829	4, 128. 37	85, 341	554	620
1920	333, 805. 20	6, 900, 366	28, 918	31, 521	3, 044. 00	62, 925	374	408
1921	375, 234. 56	7, 756, 787	36, 322	36, 322	6, 163. 51	127, 411	615	615
1922	241, 837. 04	4, 999, 215	16, 608	16, 608	12, 220. 79	252, 626	1, 391	1, 391
1923	293, 429. 92	6, 065, 735	17, 569	14, 407	8, 938. 31	184, 771	955	783
1924	208, 279. 59	4, 305, 521	14, 793	9, 911	4, 768. 22	98, 568	560	375
1925	229, 821. 98	4, 750, 842	16, 478	11, 436	3, 218. 07	66, 523	358	248
1926	239, 482. 59	4, 950, 545	17, 287	10, 787	5, 381. 06	111, 236	942	588

Gold and silver produced at placer mines in California, 1917–1926—Continued

Year	Hydraulic				Surface				Total value
	Gold		Silver		Gold		Silver		
	Fine ounces	Value	Fine ounces	Value	Fine ounces	Value	Fine ounces	Value	
1917	12, 921. 11	$267, 103	1, 000	$824	6, 126. 26	$126, 641	419	$345	$9, 096, 490
1918	10, 314. 95	213, 229	903	903	4, 121. 70	85, 203	591	591	7, 868, 688
1919	8, 941. 25	184, 832	1, 249	1, 399	2, 224. 48	45, 984	381	427	8, 064, 351
1920	3, 204. 02	66, 233	413	450	1, 503. 93	31, 089	195	212	7, 093, 204
1921	7, 875. 84	162, 808	864	864	5, 215. 70	107, 818	829	829	8, 193, 454
1922	7, 656. 57	158, 275	906	906	4, 341. 10	89, 739	708	708	5, 519, 468
1923	5, 409. 68	111, 828	626	513	7, 752. 06	160, 249	1, 155	947	6, 539, 233
1924	2, 911. 93	60, 195	409	274	6, 002. 77	124, 088	928	622	4, 599, 554
1925	8, 482. 30	175, 345	958	665	5, 003. 61	103, 434	785	545	5, 109, 038
1926	3, 344. 62	69, 139	450	281	4, 715. 72	97, 483	683	426	5, 240, 485

GOLD

The value of the mine production of gold in California in 1926 was $11,923,481, a decrease of $1,141,849, or 9 per cent, as compared with 1925. Lode mines yielded 56 per cent and placer mines 44 per cent of the total gold in 1926, as compared with 61 per cent and 39 per cent in 1925 and 65 per cent and 35 per cent, respectively, in 1924.

Four counties produced more than $1,000,000 each in gold in 1926 as compared with five counties in 1925; Sierra County mines did not reach the million mark in 1926. Yuba, with $2,769,703 produced largely by dredges, was first in rank; Nevada, with $2,318,846 largely from gold lode mines, was second; Amador, with $2,167,275 almost entirely from gold lode mines, was third; and Sacramento, with $1,304,046 entirely from placers, mostly worked by dredges, was fourth. The fifth largest output of gold, $576,889, came from Calaveras County, largely from gold lode mines and one dredge operation, and was followed by Sierra County with $564,452 virtually all from gold lode mines, and by Trinity County with $483,471 largely from dredge and hydraulic placer mines, but with more from gold lodes than in 1925.

In 1926 there were 34 companies in the State that produced more than 1,000 ounces of gold each, and they contributed 90 per cent of the total gold output of the State. This is a decrease of 7 from the 41 companies that produced more than 1,000 ounces each in 1925. Of the 34 larger companies 9 produced more than 20,000 ounces each and 3 more than 50,000 ounces; 11 of them operated 22 gold dredges, 1 a drift placer mine, 1 a silver mine, 2 operated copper mines, and 19 operated gold lode mines. The 10 largest gold-producing companies in California in 1926, in order of output, were the Yuba Consolidated Gold Fields (6 dredges), Natomas Co. of California (6 dredges), Empire Mines Co. (gold lode), Kennedy Mining & Milling Co. (gold lode), North Star Mines Co. (gold lode), Central Eureka Mining Co. (gold lode), Argonaut Mining Co. (gold lode), Carson Hill Gold Mines (Inc.) (gold lode), Original Sixteen to One mine (gold lode), and the Estabrook Gold Dredging Co. (1 dredge).

The yield of gold from placer mines in 1926 was valued at $5,228,403, an increase of 3 per cent as compared with 1925. There was an increased gold yield of 4 per cent by dredges and 67 per cent by drift mines, but decreases of 61 per cent and 6 per cent by hydraulic and surface mines, respectively, as compared with 1925. In 1926 dredges yielded 95 per cent, drift mines 2 per cent, hydraulic mines 1 per cent, and surface workings 2 per cent of the gold from California placer deposits. Production of gold by 23 dredges in 1926 was $4,950,545 as compared with $4,750,842 by 24 dredges in 1925.

There were large increases in output by dredges in Trinity and Yuba Counties and smaller increases in Placer, Sacramento, and Shasta Counties, but declines in the gold yield from dredges in Butte, Calaveras, and Stanislaus Counties. Gold produced at 75 drift mines in 1926 was valued at $111,236 as compared with $66,523 at 71 mines in 1925. Increases in gold from drift mines were recorded from Butte, Calaveras, El Dorado, Placer, Plumas, Trinity, and Yuba Counties, but decreases from drift mines in Mariposa, Nevada, Sacramento, Shasta, Sierra, and Tuolumne Counties. Drift mines in Amador and Fresno Counties were productive in 1926 but not in 1925. Gold produced at 79 hydraulic mines in 1926 was valued at $69,139 as compared with $175,345 at 98 mines in 1925. The gold output of hydraulic mines in 1926 decreased in Siskiyou County by $31,984, in Nevada County by $19,611, in Trinity County by $16,970, in Sierra County by $15,740, in Humboldt County by $12,214, and by less than $10,000 in Amador, Plumas, Shasta, and Yuba Counties. Hydraulic mines in Butte, Calaveras, and Del Norte Counties reported production in 1926 but none in 1925. Gold was produced by 306 surface mines in 1926 as compared with 166 surface or sluice operations in 1925. The total gold yield from this class of mines in 1926 was $97,483 as compared with $103,434 in 1925. In virtually all the mining counties of the State gold is recovered by itinerant placer prospectors and to apportion properly the gold produced by them is very difficult.

Placer mines in Yuba County increased their output of gold by $201,797, in Trinity County by $44,607, in Plumas County by $14,312, and in Calaveras, Placer, and Shasta Counties by approximately $10,000 each. Decreases in placer yield for 1926 as compared with 1925 were recorded in Stanislaus County ($44,344), Siskiyou County ($27,162), Butte County ($19,828), Nevada County ($19,142), Fresno County ($16,991), Sierra County ($14,030), Humboldt County ($11,899), and Amador County ($5,170).

The output of gold from 335 lode mines in California in 1926 was valued at $6,695,078, a decrease of 16 per cent from 1925, following a decrease of 7 per cent in 1925 from 1924. The output of gold from the lode mines of both Amador and Nevada Counties was more than $2,000,000. Sierra County, which in 1925 had a lode gold yield of more than $1,000,000, dropped to $546,974 in 1926 and ranked third, just above Calaveras County whose lode mines produced $510,208 in 1926. Plumas County lode mines produced more than $200,000 in gold, and more than $100,000 in gold was produced by lode mines in Kern, Mariposa, San Bernardino, Siskiyou, and Tuolumne Counties. Lode mines of most counties were less productive than in 1925, the greatest loss being $795,223 in Sierra County, followed by $165,656 in Amador County, $111,982 in Shasta County, $85,559 in Calaveras County, $51,742 in San Bernardino County, $49,344 in Placer County, $39,560 in Tuolumne County, $16,185 in

Plumas County, $11,718 in Siskiyou County, and $6,721 in Mariposa County. Nevada County lode mines in 1926 produced $32,381 more than in 1925 and there was an increased output of $965 in gold from Kern County mines.

Gold ore and tailings treated in 1926 yielded $6,334,908, or 95 per cent, copper ore and tailings yielded $232,210, or 3 per cent, silver ore and tailings yielded $84,126, or 1 per cent, and lead and zinc ores 1 per cent of the total gold from lode mines. Amalgamation mills in 1926 recovered approximately 75 per cent, cyanidation plants 17 per cent, and smelters 8 per cent of the lode gold output of California as compared with 72 per cent, 16 per cent, and 12 per cent, respectively, in 1925. It is estimated that approximately 6 per cent of the gold output from lode mines was stolen and sold by "high graders" in both 1925 and 1926.

SILVER

The mine production of silver in California in 1926 was 2,022,460 ounces, valued at $1,262,015, a decrease of 34 per cent in quantity and 40 per cent in value as compared with 1925. Five counties yielded more than 100,000 ounces of silver each in 1926, namely, San Bernardino County, with 884,045 ounces, a decrease of 1,102,110 ounces, largely from silver ore produced by the California Rand Silver (Inc.); Plumas County with 347,147 ounces, a decrease of 76,850 ounces, largely from copper ores of the Engels and Walker mines; Mono County with 194,557 ounces, an increase of 192,266 ounces; Shasta County with 177,434 ounces, a decrease of 123,456 ounces, largely from zinc and copper ores; and Inyo County with 124,508 ounces, a decrease of 45,180 ounces, most of which was from lead ore. The sixth largest producer of silver was Napa County, with 81,116 ounces from silver ores, and this was followed by Los Angeles County with 68,362 ounces from lead-zinc ores.

The yield of silver from placer mines in 1926 was 19,362 ounces, 4 per cent more than in 1925 and 0.96 per cent of the total silver output of the State. Of the 2,003,098 ounces of silver produced at lode mines in 1926 silver ore and tailings yielded 58 per cent (66 per cent in 1925), copper ore and tailings 20 per cent (23 per cent in 1925), lead ore and tailings 6 per cent (virtually the same in 1925), gold ore and tailings 5 per cent (3 per cent in 1925), zinc ore 7 per cent, and lead-zinc ore 4 per cent.

Each of 46 properties in 1926 produced more than 1,000 ounces as compared with 45 properties in 1925, and these mines yielded 98 per cent of the total silver produced in the State in both 1926 and 1925. At 31 properties the yield was between 1,000 and 10,000 ounces (30 in 1925), at 10 between 10,000 and 100,000 (11 in 1925), at 4 between 100,000 and 300,000 (3 in 1925), and at 1 mine in excess of 800,000 ounces in 1926. No mine in California produced as much as 1,000,000 ounces of silver in 1926. The 10 largest producers of silver in California in 1926, in order of output, were the California Rand Silver (Inc.), Mono Mining Co. of Nevada, Engels Copper Mining Co., Walker Mining Co., California Zinc Co., Palisades Mines Co., Santa Catalina Island Co., American Metals Co., Tecopa Consolidated Mining Co., and the Empire Mines Co.

COPPER

The mine production of copper in California in 1926 was 33,466,299 pounds, valued at $4,685,282, a decrease of 29 per cent in quantity and 30 per cent in value as compared with 1925. Plumas County led in copper output, yielding 22,163,035 pounds, a decline of 4,754,838 pounds as compared with 1925. Calaveras County was second in rank with a yield of 5,240,733 pounds, an increase of 347,319 pounds as compared with 1925. Shasta County was third in rank, producing only 5,061,355 pounds of copper in 1926, a decrease of 9,489,902 pounds as compared with 1925, due to the closing (mid year, 1925) of the United States Smelting, Refining & Mining Co.'s operations at Kennett. Trinity County yielded 760,410 pounds, or 320,644 pounds more than in 1925. Copper was also produced in San Bernardino County (176,919 pounds), Inyo County (36,845 pounds), Riverside County (22,125 pounds), and Tuolumne, Mono, and Imperial Counties in much smaller quantities.

Copper ore was the source of 89 per cent, zinc ore 6 per cent, and mine water and tailings 5 per cent of the copper recovered in 1926. A minor quantity of copper was recovered from siliceous ore and lead ore.

Crude ore smelted in California in 1926 yielded 9 per cent; concentrates smelted, 86 per cent; and tailings, including pyrite cinder and cement copper from mine water smelted, 5 per cent of the copper output of the State.

LEAD

Twenty-five properties in Inyo County shipped lead ore in 1926, and the county produced 6,556,810 pounds, or 81 per cent, of the lead yield of the State. The next largest output of lead (1,159,600 pounds) came from lead concentrates milled from lead-zinc ore mined at the Black Jack and Renton mines on Catalina Island, Los Angeles County. Riverside County ranked third in lead output in 1926 with 173,207 pounds and San Bernardino County was fourth with 169,216 pounds which came from mines in the Clark and Shadow Mountains. The total mine production of lead in the State in 1926 was 8,093,513 pounds, valued at $647,481, an increase of 23 per cent in quantity and 13 per cent in value as compared with 1925. Lead ore supplied 79 per cent, lead-zinc ore 14 per cent, old slags and tailings 4 per cent, and lead-copper ore 2 per cent of the lead output of the State. Crude ore smelted yielded 73 per cent, concentrates smelted 23 per cent, and old slags and tailings smelted 4 per cent of the lead produced in 1926.

ZINC

The mine production of zinc in California in 1926 was 20,433,887 pounds, valued at $1,532,542, an increase of 78 per cent in quantity and 76 per cent in value as compared with 1925, following an increase of 275 per cent in quantity and 339 per cent in value in 1925 over 1924. Shasta County produced 87 per cent of the total zinc (96 per cent in 1925), Los Angeles County 12 per cent, and the remaining 1 per cent came from Inyo, Orange, and San Diego Counties. The California Zinc Co. in Shasta County and the Wrigley mines (Black

Jack and Renton) in Los Angeles County concentrated their ore and exported the zinc concentrate. Zinc ore yielded 87 per cent and mixed lead-zinc ore 13 per cent of the total zinc of the State. Concentrates smelted carried more than 99½ per cent of the total output of zinc.

Mine production of gold, silver, copper, lead, and zinc in California, 1925 and 1926, by counties

1925

County	Ore and tailings (short tons)	Gold					
		Lode		Placer		Total	
		Fine ounces	Value	Fine ounces	Value	Fine ounces	Value
Alpine	5	10.60	$219			10.60	$219
Amador	366,605	112,544.57	2,326,503	561.06	$11,598	113,105.63	2,338,101
Butte	14,556	5,196.95	107,430	11,990.17	247,859	17,187.12	355,289
Calaveras	222,438	28,820.23	595,767	2,741.22	56,666	31,561.45	652,433
Del Norte				32.95	681	32.95	681
Eldorado	1,921	1,304.25	26,961	641.02	13,251	1,945.27	40,212
Fresno	33	22.20	459	1,189.86	24,597	1,212.06	25,056
Humboldt				635.75	13,142	635.75	13,142
Inyo	18,126	2,092.93	43,265	24.63	509	2,117.56	43,774
Kern	7,631	6,497.91	134,324	59.07	1,221	6,556.98	135,545
Lassen	75	54.64	1,130			54.64	1,130
Los Angeles	716			19.79	409	19.79	409
Madera	104	110.15	2,277	4.29	89	114.44	2,366
Mariposa	12,593	9,025.47	186,573	301.71	6,237	9,327.18	192,810
Merced				14.00	289	14.00	289
Mono	110	266.19	5,503			266.19	5,503
Monterey	125	48.28	998			48.28	998
Napa	275	9.44	195			9.44	195
Nevada	195,961	109,964.57	2,273,169	1,569.17	32,438	111,533.74	2,305,607
Orange	394	2.50	52			2.50	52
Placer	6,591	3,589.38	74,199	2,301.95	47,586	5,891.33	121,785
Plumas	676,632	10,900.29	225,329	1,171.20	24,211	12,071.49	249,540
Riverside	320	178.34	3,687			178.34	3,687
Sacramento				62,999.73	1,302,320	62,999.73	1,302,320
San Bernardino	82,677	7,612.97	157,374			7,612.97	157,374
San Diego	230	195.16	4,034	53.22	1,100	248.38	5,134
San Luis Obispo				40.62	840	40.62	840
Shasta	248,165	8,116.80	167,789	3,251.96	67,224	11,368.76	235,013
Sierra	37,738	64,928.76	1,342,197	1,524.21	31,508	66,452.97	1,373,705
Siskiyou	1,204	5,747.01	118,801	2,966.30	61,319	8,713.31	180,120
Stanislaus				8,308.04	171,742	8,308.04	171,742
Trinity	10,735	892.14	18,442	19,620.67	405,595	20,512.81	424,037
Tuolumne	32,569	7,244.25	149,752	282.51	5,840	7,526.76	155,592
Yuba	150	133.37	2,757	124,220.86	2,567,873	124,354.23	2,570,630
	1,938,679	385,509.35	7,969,186	246,525.96	5,096,144	632,035.31	13,065,330

Mine production of gold, silver, copper, lead, and zinc in California, 1925 and 1926, by counties—Continued

1925—Continued

County	Silver					
	Lode		Placer		Total	
	Fine ounces	Value	Fine ounces	Value	Fine ounces	Value
Alpine	2	$1			2	$1
Amador	23,162	16,074	70	$49	23,232	16,123
Butte	5,313	3,687	961	667	6,274	4,354
Calaveras	11,797	8,187	197	137	11,994	8,324
Del Norte			2	1	2	1
Eldorado	251	174	92	64	343	238
Fresno	4	3	213	148	217	151
Humboldt			90	62	90	62
Inyo	169,673	117,753	15	10	169,688	117,763
Kern	10,728	7,445	14	10	10,742	7,455
Lassen	34	24			34	24
Los Angeles	22,251	15,442	3	2	22,254	15,444
Madera	117	81	1	1	118	82
Mariposa	2,483	1,723	50	35	2,533	1,758
Merced			2	1	2	1
Mono	2,291	1,590			2,291	1,590
Monterey	4	3			4	3
Napa	2,046	1.420			2,046	1,420
Nevada	46,230	32,084	103	71	46,333	32,155
Orange	1,433	995			1,433	995
Placer	606	421	287	199	893	620
Plumas	423,870	294,166	127	88	423,997	294,254
Riverside	3,703	2,570			3,703	2,570
Sacramento			2,767	1,920	2,767	1,920
San Bernardino	1,986,155	1,378,392			1,986,155	1,378,392
San Diego	80	56	3	2	83	58
San Luis Obispo			10	7	10	7
Shasta	300,498	208,546	392	272	300,890	208,818
Sierra	12,695	8,810	157	109	12,852	8,919
Siskiyou	711	493	487	338	1,198	831
Stanislaus			1,000	694	1,000	694
Trinity	8,850	6,142	2,279	1,582	11,129	7,724
Tuolumne	845	586	40	28	885	614
Yuba	5	3	9,217	6,397	9,222	6,400
	3,035,837	2,106,871	18,579	12,894	3,054,416	2,119,765

County	Copper		Lead		Zinc		Total value
	Pounds	Value	Pounds	Value	Pounds	Value	
Alpine							$220
Amador							2,354,224
Butte	307	$44	725	$63			359,750
Calaveras	4,893,414	694,865					1,355,622
Del Norte							682
Eldorado							40,450
Fresno							25,207
Humboldt							13,204
Inyo	46,098	6,546	6,196,020	539,054	149,822	$11,386	718,523
Kern			442	38			143,038
Lassen							1,154
Los Angeles			150,820	13,121	199,420	15,156	44,130
Madera							2,448
Mariposa							194,568
Merced							290
Mono	893	127	14,044	1,222			8,442
Monterey							1,001
Napa							1,615
Nevada							2,337,762
Orange			3,027	263	70,920	5,390	6,700
Placer							122,405
Plumas	26,917,873	3,822,338					4,366,132
Riverside	11,036	1,567	115,491	10,048			17,872
Sacramento							1,304,240
San Bernardino	4,269	606	85,631	7,450			1,543,822
San Diego							5,192
San Luis Obispo							847
Shasta	14,551,257	2,066,278			11,069,075	841,250	3,351,359
Sierra							1,382,624
Siskiyou							180,951
Stanislaus							172,436
Trinity	439,766	62,447					494,208
Tuolumne							156,206
Yuba							2,577,030
	46,864,913	6,654,818	6,566,200	571,259	11,489,237	873,182	23,284,354

Mine production of gold, silver, copper, lead, and zinc in California, 1925 and 1926, by counties—Continued

1926

County	Ore, tailings, etc. (short tons)	Gold					
		Lode		Placer		Total	
		Fine ounces	Value	Fine ounces	Value	Fine ounces	Value
Amador	280,509	104,530.98	$2,160,847	310.97	$6,428	104,841.95	$2,167,275
Butte	9,721	2,893.91	59,822	11,031.00	228,031	13,924.91	287,853
Calaveras	219,474	24,681.31	510,208	3,225.69	66,681	27,907.00	576,889
Del Norte				52.17	1,078	52.17	1,078
Eldorado	2,470	3,796.48	78,480	643.83	13,309	4,440.31	91,789
Fresno	202	47.86	989	367.94	7,606	415.80	8,595
Humboldt				60.14	1,243	60.14	1,243
Imperial	19	11.49	238			11.49	238
Inyo	31,287	1,299.89	26,871			1,299.89	26,871
Kern	17,310	6,544.60	135,289	10.58	219	6,555.18	135,508
Lassen				3.23	67	3.23	67
Los Angeles	24,949	4.53	94			4.53	94
Madera	62	73.79	1,525	8.83	183	82.62	1,708
Mariposa	11,651	8,700.35	179,852	119.03	2,461	8,819.38	182,313
Modoc	10	7.62	158			7.62	158
Mono	11,397	977.35	20,204			977.35	20,204
Monterey	50	34.13	706			34.13	706
Napa	3,641	378.13	7,817			378.13	7,817
Nevada	184,924	111,531.00	2,305,550	643.19	13,296	112,174.19	2,318,846
Orange	201	2.88	60			2.88	60
Placer	1,022	1,202.35	24,855	2,808.95	58,066	4,011.30	82,921
Plumas	673,721	10,117.36	209,144	1,863.55	38,523	11,980.91	247,667
Riverside	385	141.77	2,931			141.77	2,931
Sacramento				63,083.24	1,304,046	63,083.24	1,304,046
San Bernardino	41,865	5,109.95	105,632	60.15	1,243	5,170.10	106,875
San Diego	1,472	505.43	10,448	4.60	95	510.03	10,543
Santa Cruz				6.93	143	6.93	143
Shasta	176,042	2,699.64	55,807	3,729.67	77,099	6,429.31	132,906
Sierra	27,626	26,459.89	546,974	845.48	17,478	27,305.37	564,452
Siskiyou	1,424	5,180.16	107,083	1,652.33	34,157	6,832.49	141,240
Stanislaus				6,162.90	127,398	6,162.90	127,398
Trinity	20,449	1,609.40	33,269	21,778.50	450,202	23,387.90	483,471
Tuolumne	18,975	5,330.56	110,192	468.30	9,681	5,798.86	119,873
Yuba	1	1.60	33	133,982.79	2,769,670	133,984.39	2,769,703
	1,760,859	323,874.41	6,695,078	252,923.99	5,228,403	576,798.40	11,923,481

County	Silver					
	Lode		Placer		Total	
	Fine ounces	Value	Fine ounces	Value	Fine ounces	Value
Amador	21,474	$13,400	36	$22	21,510	$13,422
Butte	3,772	2,354	1,031	643	4,803	2,997
Calaveras	9,696	6,050	287	179	9,983	6,229
Del Norte			6	4	6	4
Eldorado	684	427	72	45	756	472
Fresno	24	15	60	37	84	52
Humboldt			10	6	10	6
Imperial	31	19			31	19
Inyo	124,508	77,693			124,508	77,693
Kern	7,473	4,663	6	4	7,479	4,667
Lassen			1	1	1	1
Los Angeles	68,362	42,658			68,362	42,658
Madera	34	21	1	1	35	22
Mariposa	2,405	1,501	28	17	2,433	1,518
Modoc	5	3			5	3
Mono	194,557	121,104			194,557	121,401
Monterey	5	3			5	3
Napa	81,116	50,616			81,116	50,616
Nevada	48,029	29,970	72	45	48,101	30,015
Orange	1,550	967			1,550	967
Placer	216	135	338	211	554	346
Plumas	346,606	216,282	541	338	347,147	216,620
Riverside	5,024	3,135			5,024	3,135
Sacramento			2,607	1,627	2,607	1,627

Mine production of gold, silver, copper, lead, and zinc in California, 1925 and 1926, by counties—Continued

1926—Continued

County	Silver—Continued					
	Lode		Placer		Total	
	Fine ounces	Value	Fine ounces	Value	Fine ounces	Value
San Bernardino	884, 033	$551, 637	12	$7	884, 045	$551, 644
San Diego	545	340			545	340
Santa Cruz			1	1	1	1
Shasta	176, 761	110, 299	673	420	177, 434	110, 719
Sierra	4, 590	2, 864	79	49	4, 669	2, 913
Siskiyou	861	537	276	172	1, 137	709
Stanislaus			659	411	659	411
Trinity	19, 024	11, 871	2, 251	1, 405	21, 275	13, 276
Tuolumne	1, 713	1, 069	80	50	1, 793	1, 119
Yuba			10, 235	6, 387	10, 235	6, 387
	2, 003, 098	1, 249, 933	19, 362	12, 082	2, 022, 460	1, 262, 015

County	Copper		Lead		Zinc		Total value
	Pounds	Value	Pounds	Value	Pounds	Value	
Amador			825	$66			$2, 180, 763
Butte							290, 850
Calaveras	5, 240, 733	$733, 703					1, 316, 821
Del Norte							1, 082
Eldorado							92, 261
Fresno							8, 647
Humboldt							1, 249
Imperial	282	39	361	29			325
Inyo	36, 845	5, 158	6, 556, 810	524, 545	69, 027	$5, 177	639, 444
Kern							140, 175
Lassen							68
Los Angeles			1, 159, 600	92, 768	2, 523, 650	189, 274	324, 794
Madera							1, 730
Mariposa							183, 831
Modoc							161
Mono	2, 263	317	20, 905	1, 672			143, 597
Monterey							709
Napa							58, 433
Nevada							2, 348, 861
Orange			5, 127	410	40, 000	3, 000	4, 437
Placer							83, 267
Plumas	22, 163, 035	3, 102, 825	326	26			3, 567, 138
Riverside	22, 125	3, 098	173, 207	13, 857			23, 021
Sacramento							1, 305, 673
San Bernardino	176, 919	24, 769	169, 216	13, 537			696, 825
San Diego			3, 173	254	4, 000	300	11, 437
Santa Cruz							144
Shasta	5, 061, 355	708, 590	3, 963	317	17, 797, 210	1, 334, 791	2, 287, 323
Sierra							567, 365
Siskiyou							141, 949
Stanislaus							127, 809
Trinity	760, 410	106, 457					603, 204
Tuolumne	2, 332	326					121, 318
Yuba							2, 776, 090
	33, 466, 299	4, 685, 282	8, 093, 513	647, 481	20, 433, 887	1, 532, 542	20, 050, 801

Ore, tailings, etc., sold or treated, lode mines producing, and average value of ore, etc., in California, 1925 and 1926, by counties

County	Ore, tailings, etc. (short tons)		Lode mines producing		Average value per ton in all metals		Average value per ton in gold and silver	
	1925	1926	1925	1926	1925	1926	1925	1926
Alpine	5		1		$44.00		$44.00	
Amador	366,605	280,509	16	15	6.39	$7.75	6.39	$7.75
Butte	14,556	9,721	8	3	7.64	6.40	7.63	6.40
Calaveras	222,438	219,474	24	18	5.84	5.70	2.72	2.35
Eldorado	1,921	2,470	16	18	14.13	31.95	14.13	31.95
Fresno	33	202	3	4	14.00	4.97	14.00	4.97
Imperial		19		3		17.11		13.53
Inyo	18,126	31,287	34	33	39.61	20.44	8.88	3.34
Kern	7,631	17,310	29	27	18.58	8.09	18.58	8.09
Lassen	75		1		15.39		15.39	
Los Angeles	716	24,949	1	2	61.06	13.02	21.57	1.71
Madera	104	62	6	3	22.67	24.94	22.67	24.94
Mariposa	12,593	11,651	22	19	14.95	15.57	14.95	15.57
Modoc		10		1		16.10		16.10
Mono	110	11,397	9	11	76.75	12.60	64.48	12.43
Monterey	125	50	1	1	8.01	14.18	8.01	14.18
Napa	275	3,641	2	1	5.87	16.05	5.87	16.05
Nevada	195,961	184,924	16	16	11.76	12.63	11.76	12.63
Orange	394	201	1	1	17.01	22.07	2.66	5.11
Placer	6,591	1,022	7	6	11.32	24.45	11.32	24.45
Plumas	676,632	673,721	14	9	6.42	5.24	.77	.63
Riverside	320	385	2	3	55.85	59.79	19.55	15.76
San Bernardino	82,677	41,865	32	41	18.67	16.61	18.58	15.70
San Diego	230	1,472	5	6	17.78	7.71	17.78	7.33
Shasta	248,165	176,042	22	19	13.23	12.55	1.52	.94
Sierra	37,738	27,626	17	11	35.80	19.90	35.80	19.90
Siskiyou	1,204	1,424	13	16	99.08	75.58	99.08	75.58
Trinity	10,735	20,449	7	11	8.11	7.41	2.29	2.21
Tuolumne	32,569	18,975	21	36	4.62	5.88	4.62	5.86
Yuba	150	1	2	1	18.40	33.00	18.40	33.00
	1,938,679	1,760,859	332	335	9.38	8.41	5.20	4.51

Production of placer mines in California, 1925 and 1926, by counties

County	Mines				Gold	Silver (fine ounces)	Total value
	Dredge	Drift	Hydraulic	Surface			
1925							
Amador			3	4	$11,598	70	$11,647
Butte	3	3		10	247,859	961	248,526
Calaveras	1	2		8	56,666	197	56,803
Del Norte				3	681	2	682
Eldorado		5		17	13,251	92	13,315
Fresno				5	24,597	213	24,745
Humboldt			6		13,142	90	13,204
Inyo				3	509	15	519
Kern				3	1,221	14	1,231
Los Angeles				3	409	3	411
Madera				2	89	1	90
Mariposa		1		10	6,237	50	6,272
Merced				2	289	2	290
Nevada		7	3	3	32,438	103	32,509
Placer	1	20		10	47,586	287	47,785
Plumas		3	5	15	24,211	127	24,299
Sacramento	6	1		1	1,302,320	2,767	1,304,240
San Diego				3	1,100	3	1,102
San Luis Obispo				1	840	10	847
Shasta	1	2	1	11	67,224	392	67,496
Sierra		7	5	7	31,508	157	31,617
Siskiyou			39	19	61,319	487	61,657
Stanislaus	1			3	171,742	1,000	172,436
Trinity	3	3	35	11	405,595	2,279	407,177
Tuolumne		12			5,840	40	5,868
Yuba	8	5	1	12	2,567,873	9,217	2,574,270
	24	71	98	166	5,096,144	18,579	5,109,038

Production of placer mines in California, 1925 and 1926, by counties—Continued

County	Mines				Gold	Silver (fine ounces)	Total value
	Dredge	Drift	Hydraulic	Surface			
1926							
Amador		1	3	6	$6,428	36	$6,450
Butte	2	3	1	27	228,031	1,031	228,674
Calaveras	1	4	1	18	66,681	287	66,860
Del Norte			1	4	1,078	6	1,082
Eldorado		5		34	13,309	72	13,354
Fresno		1		10	7,606	60	7,643
Humboldt			3	3	1,243	10	1,249
Kern				1	219	6	223
Lassen				1	67	1	68
Madera				2	183	1	184
Mariposa				14	2,461	28	2,478
Nevada		5		14	13,296	72	13,341
Placer	1	24		34	58,066	338	58,277
Plumas		5	4	5	38,523	541	38,861
Sacramento	6	1		3	1,304,046	2,607	1,305,673
San Bernardino				6	1,243	12	1,250
San Diego				1	95		95
Santa Cruz				1	143	1	144
Shasta	2			29	77,099	673	77,519
Sierra		4	3	15	17,478	79	17,527
Siskiyou			35	48	34,157	276	34,329
Stanislaus	1			3	127,398	659	127,809
Trinity	3	5	28	10	450,202	2,251	451,607
Tuolumne		3		14	9,681	80	9,731
Yuba	7	14		3	2,769,670	10,235	2,776,057
	23	75	79	306	5,228,403	19,362	5,240,485

MINING INDUSTRY

The output of gold, silver, copper, lead, and zinc in the State in 1926 was from 34 counties, the same number as in 1925. Production in 1926 came from 818 properties (691 in 1925), of which 483 were placers and 335 lode mines. In 1926 no output was recorded from Alpine, Merced, and San Luis Obispo Counties, which made a small production in 1925. Mines in Imperial and Modoc Counties produced in 1926 and not in 1925, and in 1926 for the first time in many years a little placer gold was saved from beach mines in Santa Cruz County. Named in order of output, the 11 counties making the largest production of metals in 1926 were Plumas, Yuba, Nevada, Shasta, Amador, Calaveras, and Sacramento, each with a yield of more than a million dollars, and San Bernardino, Inyo, Trinity, and Sierra Counties, each with more than half a million. The yield of Amador, Nevada, and Sierra Counties was largely from gold lode mines, that of Calaveras largely from a copper mine and gold lode mines, that of Plumas and Trinity from copper mines, that of Shasta from copper and zinc mines, that of Inyo largely from lead mines, that of San Bernardino largely from a silver mine, and that of Yuba and Sacramento Counties largely from gold dredges.

The lode mines yielding gold were less productive than in 1925, but more development was going on at various camps than for the last few years. Placer miners had a greater yield than in 1925, though all reported short water and the hydraulic season was particularly short. The winter rains late in November were a great help in permitting clean-ups during 1926 that would otherwise have been impossible.

In the northern counties the chief producers were the California Zinc Co. at the Bully Hill and Afterthought zinc mines, the Mason Valley Mines Co. at the Balaklala mine, and the Island Copper Co. at the Island Mountain mine. A considerable output of gold was made at the Independence mine, near Happy Camp, and the United Trinity mines, near Minersville, were successfully operated. The Trinity dredge, after being rebuilt, began digging in May.

The Yuba Consolidated Gold Fields, the largest producer of gold in California, operated six dredges on the Feather River at Hammonton, Yuba County. The Engels and Walker copper mines in Plumas County did not produce as much as in 1925, but were the largest producers of copper in the State in 1926. In Sierra County the Original Sixteen to One mine made a large output of gold, although it was less than half as much as that of the banner year 1925. In the Grass Valley-Nevada City district there was considerable activity. The Empire continued operations on its usual scale, the extensive development program at the North Star was completed, and the Idaho-Maryland was operated successfully.

Ore treated and gold and silver recovered at gold mills in Mother Lode counties in California, 1925 and 1926 [1]

County	Ore treated	Gold and silver recovered in bullion			Concentrates produced [2]	Gold and silver recovered from concentrates			Value of total recovery	
		Gold	Silver	Average value per ton of ore		Gold	Silver	Average value per ton of concentrates	Total	Average value per ton of ore
1925	*Short tons*	*Fine ounces*	*Fine ounces*		*Short tons*	*Fine ounces*	*Fine ounces*			
Amador	281, 060	89, 093. 36	17, 758	$6. 60	3, 914	15, 446. 03	4, 042	$82. 30	$2, 176, 150	$7. 74
Calaveras	109, 269	17, 081. 46	1, 626	3. 24	3, 681	11, 579. 99	3, 125	65. 62	595, 782	5. 45
Eldorado	1, 919	1, 299. 26	249	14. 09	--------	----------	------	--------	27, 031	14. 09
Mariposa	12, 592	8, 634. 75	2, 112	14. 29	28	369. 28	365	281. 68	187, 849	14. 92
Tuolumne	32, 569	2, 180. 53	581	1. 40	1, 842	5, 063. 72	264	56. 93	150, 338	4. 62
	437, 409	118, 289. 36	22, 326	5. 63	9, 465	32, 459. 02	7, 796	71. 46	3, 137, 150	7. 17
1926										
Amador	280, 502	90, 177. 29	17, 838	6. 69	3, 342	14, 099. 93	3, 585	87. 88	2, 168, 969	7. 73
Calaveras	96, 870	14, 583. 64	2, 068	3. 13	2, 680	9, 977. 59	2, 103	77. 45	510, 328	5. 27
Eldorado	2, 470	3, 778. 58	673	31. 79	4	17. 90	11	94. 25	78, 907	31. 95
Mariposa	11, 451	8, 342. 44	2, 034	15. 17	55	262. 56	279	101. 85	179, 325	15. 66
Tuolumne	18, 950	4, 477. 56	1, 235	4. 93	241	853. 00	468	74. 38	111, 255	5. 87
	410, 243	121, 359. 51	23, 848	6. 15	6, 322	25, 210. 98	6, 446	83. 07	3, 048, 784	7. 43

[1] Tailings excluded.

[2] Includes only concentrates made from gold ore.

On the Mother Lode the Plymouth mine, taken over by the Argonaut interests in 1925, began production in September after several months of development and exploration work. The Central Eureka at Sutter Creek had a very successful year and opened some valuable ore bodies in new ground on the lower levels. At Jackson the Kennedy installed an electric hoist and continued its large production. The Argonaut was worked on a somewhat lessened scale. A small amount of development was under way on the lode between Jackson and Angels Camp, but no ore was milled. At the Carson Hill mines near Melones good ore was opened in the Morgan ground, but milling was suspended near the close of the year. In Tuolumne County the Clio and Shawmut mines on the Mother Lode were productive, and there was some activity at several smaller mines near Jamestown and Tuttletown. There was very little activity at the mines on the lode in Mariposa County.

The average recovery of gold and silver from Mother Lode ores treated in 1926 was $7.43 a ton, of which $6.15 was recovered as bullion and the remainder in concentrates that had an average value of $83.07 a ton. Comparable figures for 1925 were $7.17 a ton for total recovery, $5.63 in bullion, and $71.46 a ton from concentrates. It is believed that the recovery in Mother Lode milling practice ranges from 95 to 98 per cent.

The Zenda mine near Loraine, Kern County, began production from its large body of low-grade silver-gold ore. At Randsburg the California Rand Silver (Inc.) produced till September, when milling was discontinued pending development.

Inyo County lead mines were particularly active, the Ophir, near Trona, the Tecopa, and Darwin making large contributions to the lead output of the State. Many smaller operators contributed to the large total of the county.

In the southern counties the largest production was from the lead-zinc mines on Catalina Island. A large tonnage of siliceous ore was shipped from Ludlow. Copper ore was shipped from the Von Trigger mine near Goffs, and the Mecca Mines Co. in Riverside County shipped to Arizona smelters. Several gold properties in the vicinity of Victorville and Perris were under development.

The dredging industry of California was 4 per cent more productive than in 1925, the yield of gold and silver from dredges in 1926 being valued at $4,961,332, of which $4,950,545 was in gold. There were 23 boats in operation as compared with 24 in 1925. Two dredges on Cottonwood Creek, Shasta County, were digging in 1926 and 3 boats on Trinity River, Trinity County, were worked. In Butte County 2 boats were working on Feather River. One dredge on Willow Creek and the 6 boats of the Yuba Consolidated Gold Fields were operated in Yuba County. In Placer County 1 boat near Applegate was worked on the American River, and 6 boats of the Natomas Co. of California were in continuous operation in the Natoma field, Sacramento County. In Calaveras County there was 1 dredge in operation on the Calaveras River near Jenny Lind, and in Stanislaus County there was 1 on the Tuolumne River. The total quantity of gravel dug by dredges in 1926 was 52,084,500 cubic yards (49,552,000 in 1925), indicating an average recovery of 9.53 cents a yard as compared with 9.61 cents in 1925, 9.32 cents in 1924, and 10.25 cents in 1923. The total production of gold by dredges since the beginning of the industry has been $150,071,842, of which the Feather River field has yielded $33,083,349, the Yuba River field $57,117,216, and the American River field $34,922,803.

During the session of the State legislature that met in the fall of 1926 the mining interests were particularly interested in the report of the California Hydraulic Commission which was authorized in the 1924–25 session of the legislature. The report of the commission was prepared by Arthur Jarman, who collected a large amount of valuable unpublished data, critically studied the published data, and visited most of the hydraulic mines in the Sacramento River drainage. As a result of his studies Mr. Jarman recommended—

> that a sum of $300,000 be appropriated for preliminary engineering necessary to obtain precise data upon those dam sites that give promise of favorable results upon Bear River, and the North Fork and Middle Fork of the American River, and to acquire the lands affected. Detail surveys are required on these sites and drilling to ascertain rock conditions to enable final estimates of dam construction to be calculated. If this work be started in the spring of 1927, it could be completed in that year. The preliminary estimates just completed indicate that a sum of approximately $905,000 will provide dams for 20 years of hydraulic mining on these streams. The gold production from this work is estimated to exceed $8,000,000 in that time. Payments by miners for débris stored during this period will automatically provide capacity for further work.
>
> In addition to the above it is recommended that storage be purchased in a dam to be constructed by a private corporation at the Narrows site on the main Yuba River. The quantity offered for purchase is the total débris storage of a dam to be erected to a crest elevation of 520 feet above sea level, some water space being reserved for hydroelectric power and irrigation purposes. The calculation of débris capacity will be subject to approval by the California Débris Commission in the usual manner. Preliminary estimates show 350,000,000 cubic yards and a cost of $1,500,000. The balance of the cost will be carried by the power and irrigation features of the project. This is a much greater amount of storage than could be obtained for the same money at other sites surveyed on the Yuba. It will enable mines to work on both the South and Middle Yuba Rivers. The production for 20 years is estimated at $14,000,000 from about 130,000,000 cubic yards of gravel. At the end of the 20 years there will still be space in this reservoir for another 20 years of work at the same rate.
>
> The storage would be vested in the California Débris Commission and would be paid for by mines operating behind the dams according to the yardage of gravel washed each season, as measured at the mine, credit being given for material permanently stacked at the mine, the surveys being made by the commission or as directed by the commission. Power to purchase débris storage in lieu of erecting a dam would have to be added to the Caminetti Act by Congress. It is also necessary to enact a new method of charging for impounding débris according to the actual volume of gravel discharge from the mine. The act now specifies a charge of 3 per cent of the gross output of each mine. This is so small that the dams would never be paid for.
>
> It is now suggested that the charge for each river be determined separately, the basis being the return of the capital outlay by the time the allowable débris has been worked about the dam. In this report the dams have been calculated to allow 20 years' work. In the case of the Yuba River at the Narrows it would take 40 years of work at the rate calculated, but the development of extra water supplies and improvements in methods would speed up this work and reduce the time; 300,000,000 cubic yards at $1,500,000 would be 0.5 cent per cubic yard, which is low enough to insure the working of these low-grade gravels. The determination of impounding costs must await the exact estimates of construction costs, which can not be made until drilling has been carried out at each dam site.
>
> The preliminary estimates of the above plan total $2,405,000. This initial outlay enables hydraulic mining to be revived on the Bear, American, and Yuba Rivers, to an annual production exceeding $1,150,000, and will provide for the gravel that will be mined in the first 20 years, and for a much longer period on the Middle and South Yuba Rivers. The cost of the dams and purchased storage will be returned by débris impounding fees, which, under the Caminetti Act, are used for maintenance and to provide additional storage as required.
>
> This plan is feasible and can be carried out at much below the capital cost involved in any other plan that has been suggested as a solution of the troubles of the hydraulic miner. It deals only with gravel that can be mined with the existing water supplies.

As a result of Mr. Jarman's recommendation and the favorable comment of the hydraulic commission, Representative H. H. Cloudman introduced a bill in the assembly appropriating $200,000 for the completion of engineering studies and the purchase of dam sites to assist the resumption of hydraulic mining. This bill passed the lower house but was defeated in the senate by one vote.

Mr. Stewart, the owner of large hydraulic interests in Placer County, has reviewed the history of the hydraulic controversy[2] and pointed out the benefits to the mining and agricultural interest of the State.

In the Engineering and Mining Journal several editorials with regard to the hydraulic mining problem have appeared; two in particular[3] point out the legal difficulties to be overcome and describe the work of the State hydraulic mining commission.

Ore, tailings, etc., sold or treated in California, 1921–1926, with content in terms of recovered metals

DRY GOLD ORE

Year	Ore, tailings, etc.	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
1921	863, 720	353, 993. 36	108, 603	9, 878	640	
1922	984, 785	430, 809. 45	97, 128	3, 296	1, 981	
1923	789, 026	311, 477. 79	82, 787	192	288	
1924	986, 098	383, 796. 60	155, 869	700	5, 613	
1925	803, 712	359, 390. 88	104, 560	122		
1926	660, 095	306, 451. 20	98, 427	119, 846	3, 991	
DRY SILVER ORE						
1921	38, 846	8, 940. 86	3, 220, 927			
1922	67, 363	5, 092. 94	2, 375, 361	7, 514	215	
1923	136, 633	9, 979. 00	2, 762, 977	4, 950	4, 130	
1924	89, 760	8, 255. 74	2, 295, 683			
1925	82, 913	7, 073. 75	1, 992, 859			
1926	57, 231	4, 069. 57	1, 154, 087	714	679	
COPPER ORE						
1921	306, 134	1, 439. 01	175, 870	11, 599, 540		
1922	447, 200	5, 728. 85	320, 977	21, 845, 111	214	
1923	571, 645	8, 523. 74	360, 345	28, 238, 052		
1924	917, 806	21, 129. 50	876, 293	51, 668, 117		
1925	999, 006	16, 584. 58	704, 506	[a] 46,166, 627		
1926	930, 464	11, 233. 14	397, 174	[a] 31,413, 715	687	
LEAD ORE						
1921	3, 947	806. 93	82, 267	34, 853	1, 123, 636	
1922	26, 466	1, 451. 81	263, 681	65, 944	6, 305, 832	
1923	38, 304	1, 654. 38	330, 241	66, 881	9, 510, 172	
1924	16, 536	795. 37	188, 098	78, 354	4, 758, 193	
1925	18, 208	2, 277. 62	174, 494	58, 342	6, 364, 985	27, 238
1926	30, 445	1, 027. 29	128, 027	34, 669	6, 740, 354	
ZINC ORE						
1921	2, 953	50. 99	2, 926	99, 133		846, 184
1922	14, 072	529. 48	15, 390	613, 482		3, 012, 950
1923						
1924	9, 000	200. 00	22, 500	360, 000		3, 060, 000
1925	33, 384	180. 02	33, 492	639, 822	4, 072	11, 125, 523
1926	57, 079	950. 99	150, 053	1, 875, 230	6, 695	17, 866, 237

[a] Includes copper from mine water.

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[2] Stewart, J. D., "Inception and development of hydraulic mines in California": Min. Cong. Jour., vol. 12, Sept. 1926, pp. 638–640; "Conflict between farmers and hydraulic mines": Min. Cong. Jour., vol. 12, Oct. 1926, pp. 739–740; "Benefits that will follow a resumption of hydraulic mining": Min. Cong. Jour., vol. 12, Nov. 1926, pp. 786–787.

[3] Engineering and Mining Journal, "Legal difficulties in way of resumption of hydraulic mining in California": Vol. 121, May 15, 1926, pp. 802–804; "California hydraulic mining investigation": Vol. 122, Sept. 25, 1926, p. 507.

Ore, tailings, etc., sold or treated in California, 1921–1926, with content in terms of recovered metals—Continued

LEAD-COPPER ORE

Year	Ore, tailings, etc.	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
1921						
1922	47	9.95	7,915	4,138	4,294	
1923	83	44.87	2,788	7,684	35,090	
1924						
1925						
1926	383	135.60	5,022	22,125	173,207	

LEAD-ZINC ORE[b]

Year	Ore, tailings, etc.	Gold	Silver	Copper	Lead	Zinc
1925	1,456	2.50	25,926		197,143	336,476
1926	25,162	6.62	70,308		1,167,900	2,567,650

[b] No lead-zinc ore, classified as such, in 1921 to 1924, inclusive.

Ore, tailings, etc., sold or treated in California, 1925 and 1926, with content in terms of recovered metals

1925

Source	Mines producing	Ore and tailings		Gold		Silver	
		Short tons	Per cent	Fine ounces	Per cent	Fine ounces	Per cent
Dry gold ore and tailings	256	803,712	41.46	359,390.88	56.86	104,560	3.42
Dry silver ore and tailings	10	82,913	4.28	7,073.75	1.12	1,992,859	65.25
Copper ore and tailings	17	999,006	51.53	16,584.58	2.62	704,506	23.06
Lead ore	44	18,208	.94	2,277.62	.36	174,494	5.71
Zinc ore	2	33,384	1.72	180.02	.03	33,492	1.10
Lead-zinc ore	3	1,456	.07	2.50		25,926	.85
Total, lode mines	[1] 332	1,938,679	100.00	385,509.35	60.99	3,035,837	99.39
Total, placers	359			246,525.96	39.01	18,579	.61
	691	1,938,679	100.00	632,035.31	100.00	3,054,416	100.00

Source	Copper		Lead		Zinc	
	Pounds	Per cent	Pounds	Per cent	Pounds	Per cent
Dry gold ore and tailings	122					
Dry silver ore and tailings						
Copper ore and tailings	[2] 46,166,627	98.51				
Lead ore	58,342	.12	6,364,985	96.94	27,238	0.24
Zinc ore	639,822	1.37	4,072	.06	11,125,523	96.83
Lead-zinc ore			197,143	3.00	336,476	2.93
	46,864,913	100.00	6,566,200	100.00	11,489,237	100.00

[1] A mine producing more than one class of ore is counted but once in arriving at total for all classes.
[2] Includes copper from mine water.

Ore, tailings, etc., sold or treated in California, 1925 and 1926, with content in terms of recovered metals—Continued

1926

Source	Mines producing	Ore, tailings, etc.		Gold		Silver	
		Short tons	Per cent	Fine ounces	Per cent	Fine ounces	Per cent
Dry gold ore and tailings	252	660,095	37.49	306,451.20	53.13	98,427	4.87
Dry silver ore and tailings	16	57,231	3.25	4,069.57	.71	1,154,087	57.06
Copper ore, tailings, etc	18	930,464	52.84	11,233.14	1.95	397,174	19.64
Lead ore and tailings	42	30,445	1.73	1,027.29	.18	128,027	6.33
Zinc ore	3	57,079	3.24	950.99	.16	150,053	7.42
Lead-copper ore	1	383	.02	135.60	.02	5,022	.25
Lead-zinc ore	3	25,162	1.43	6.62		70,308	3.47
Total, lode mines	[1] 335	1,760,859	100.00	323,874.41	56.15	2,003,098	99.04
Total, placers	483			252,923.99	43.85	19,362	.96
	818	1,760,859	100.00	576,798.40	100.00	2,022,460	100.00

Source	Copper		Lead		Zinc	
	Pounds	Per cent	Pounds	Per cent	Pounds	Per cent
Dry gold ore and tailings	119,846	0.36	3,991	0.05		
Dry silver ore and tailings	714		679	.01		
Copper ore, tailings, etc	[2] 31,413,715	93.87	687	.01		
Lead ore and tailings	34,669	.10	6,740,354	83.28		
Zinc ore	1,875,230	5.60	6,695	.08	17,866,237	87.43
Lead-copper ore	22,125	.07	173,207	2.14		
Lead-zinc ore			1,167,900	14.43	2,567,650	12.57
	33,466,299	100.00	8,093,513	100.00	20,433,887	100.00

[1] A mine producing more than one class of ore is counted but once in arriving at total for all classes.
[2] Includes copper from mine water.

Value of metals from ore, tailings, etc., treated in California, 1925 and 1926

Kind of ore	Ore, tailings, etc. (short tons)	Total value		Average value per ton	
		In gold and silver	In all metals	In gold and silver	In all metals
1925					
Dry gold ore and tailings	803,712	$7,501,834	$7,501,851	$9.33	$9.33
Dry silver ore and tailings	82,913	1,529,272	1,529,272	18.44	18.44
Copper ore and tailings	999,006	831,761	[1] 7,387,422	.83	7.39
Lead ore	18,208	168,181	732,290	9.24	40.22
Zinc ore	33,384	26,965	963,713	.81	28.87
Lead-zinc ore	1,456	18,044	60,768	12.39	41.74
	1,938,679	10,076,057	18,175,316	5.20	9.38
1926					
Dry gold ore and tailings	660,095	6,396,326	6,413,423	9.69	9.72
Dry silver ore and tailings	57,231	804,276	804,430	14.05	14.06
Copper ore, tailings, etc	930,464	480,046	[1] 4,878,021	.52	5.24
Lead ore and tailings	30,445	101,125	645,207	3.32	21.19
Zinc ore	57,079	113,292	1,716,328	1.98	30.07
Lead-copper ore	383	5,937	22,892	15.50	59.77
Lead-zinc ore	25,162	44,009	330,015	1.75	13.12
	1,760,859	7,945,011	14,810,316	4.51	8.41

[1] Includes value of copper from mine water.

Ore, tailings, etc., sold or treated in California, 1925 and 1926, by counties, with content in terms of recovered metals

1925

DRY GOLD ORE

County	Ore, tailings, etc.	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Alpine	5	10.60	2			
Amador	[1] 366,605	112,544.57	23,162			
Butte	14,551	5,193.18	4,803			
Calaveras	109,273	28,684.93	4,765			
Eldorado	1,921	1,304.25	251			
Fresno	33	22.20	4			
Inyo	195	70.90	73	122		
Kern	6,537	6,430.61	3,331			
Lassen	75	54.64	34			
Madera	104	110.15	117			
Mariposa	12,593	9,025.47	2,483			
Mono	65	263.81	238			
Monterey	125	48.28	4			
Nevada	195,961	109,964.57	46,230			
Placer	6,591	3,589.38	606			
Plumas	1,318	682.92	137			
San Bernardino	744	542.05	170			
San Diego	230	195.16	80			
Shasta	13,188	2,326.20	3,749			
Sierra	37,738	64,928.76	12,695			
Siskiyou	1,204	5,747.01	711			
Trinity	1,937	273.62	65			
Tuolumne	32,569	7,244.25	845			
Yuba	[2] 150	133.37	5			
	803,712	359,390.88	104,560	122		
DRY SILVER ORE						
Kern	1,074	67.30	7,382			
Napa	275	9.44	2,046			
San Bernardino	[3] 81,564	6,997.01	1,983,431			
	82,913	7,073.75	1,992,859			
COPPER ORE						
Calaveras	113,165	135.30	7,032	[5] 4,893,414		
Mono	20	2.00	1,542	893		
Plumas	675,314	10,217.37	423,733	26,917,873		
Riverside	1		32	392		
San Bernardino	22	.81	125	2,854		
Shasta	[4] 201,686	5,610.58	263,257	[5] 13,911,435		
Trinity	8,798	618.52	8,785	439,766		
	999,006	16,584.58	704,506	46,166,627		
LEAD ORE						
Butte	5	3.77	510	307	725	
Inyo	17,492	2,022.03	167,358	45,976	6,148,652	27,238
Kern	20		15		442	
Mono	25	.38	511		14,044	
Riverside	319	178.34	3,671	10,644	115,491	
San Bernardino	347	73.10	2,429	1,415	85,631	
	18,208	2,277.62	174,494	58,342	6,364,985	27,238
ZINC ORE						
Inyo	93				4,072	56,448
Shasta	33,291	180.02	33,492	639,822		11,069,075
	33,384	180.02	33,492	639,822	4,072	11,125.523

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[1] Includes 85,545 tons of tailings.
[2] Includes 100 tons of tailings.
[3] Includes 525 tons of tailings.
[4] Includes 92,362 tons of tailings.
[5] Includes copper from mine water.

Ore, tailings, etc., sold or treated in California, 1925 and 1926, by counties, with content in terms of recovered metals—Continued

1925—Continued

LEAD-ZINC ORE

County	Ore, tailings, etc.	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Inyo	346		2,242		43,296	66,136
Los Angeles	716		22,251		150,820	199,420
Orange	394	2.50	1,433		3,027	70,920
	1,456	2.50	25,926		197,143	336,476

1926

DRY GOLD ORE

Amador	280,509	104,530.98	21,474		825	
Butte	9,721	2,893.91	3,772			
Calaveras	96,901	24,572.31	4,196			
Eldorado	2,470	3,796.48	684			
Fresno	202	47.86	24			
Imperial	17	11.49	5	282		
Inyo	[6] 1,124	321.71	810	264	2,840	
Kern	9,307	6,422.66	2,330			
Los Angeles	10	4.53				
Madera	62	73.79	34			
Mariposa	11,651	8,700.35	2,405			
Modoc	10	7.62	5			
Mono	[7] 1,095	721.83	1,040			
Monterey	50	34.13	5			
Nevada	184,924	111,531.00	48,029			
Placer	1,022	1,202.35	216			
Plumas	2,021	922.27	125		326	
Riverside	2	6.17	2			
San Bernardino	5,527	1,630.53	5,519	119,300		
San Diego	1,450	501.69	149			
Shasta	578	931.72	186			
Sierra	27,626	26,459.89	4,590			
Siskiyou	1,424	5,180.16	861			
Trinity	3,441	613.61	263			
Tuolumne	18,950	5,330.56	1,703			
Yuba	1	1.60				
	660,095	306,451.20	98,427	119,846	3,991	

DRY SILVER ORE

Inyo	5	3.79	321			
Kern	8,003	121.94	5,143			
Mono	10,194	225.86	191,126			
Napa	3,641	378.13	81,116			
San Bernardino	[8] 35,388	3,339.85	876,381	714	679	
	57,231	4,069.57	1,154,087	714	679	

COPPER ORE

Calaveras	122,573	109.00	5,500	5,240,733		
Inyo	16	3.00	37	2,600		
Mono	62	17.38	54	1,801		
Plumas	671,700	9,195.09	346,481	22,163,035		
San Bernardino	579	96.30	632	56,679	687	
Shasta	[9] 118,501	816.58	25,699	[5] 3,186,125		
Trinity	17,008	995.79	18,761	760,410		
Tuolumne	25		10	2,332		
	930,464	11,233.14	397,174	31,413,715	687	

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[5] Includes copper from mine water.
[6] Includes 1,000 tons of tailings.
[7] Includes 500 tons of tailings.
[8] Includes 800 tons of tailings.
[9] Includes 98,881 tons of tailings.

Ore, tailings, etc., sold or treated in California, 1925 and 1926, by counties, with content in terms of recovered metals—Continued

1926—Continued

LEAD ORE

County	Ore, tailings, etc.	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Imperial	2		26		361	
Inyo	[10] 29,991	971.39	123,340	33,981	6,547,275	
Mono	46	12.28	2,337	462	20,905	
San Bernardino	371	43.27	1,501	226	167,850	
Shasta	35	.35	823		3,963	
	30,445	1,027.29	128,027	34,669	6,740,354	

ZINC ORE

County	Ore, tailings, etc.	Gold	Silver	Copper	Lead	Zinc
Inyo	151				6,695	69,027
Shasta	56,928	950.99	150,053	1,875,230		17,797,210
	57,079	950.99	150,053	1,875,230	6,695	17,866,237

LEAD-COPPER ORE

County	Ore, tailings, etc.	Gold	Silver	Copper	Lead	Zinc
Riverside	383	135.60	5,022	22,125	173,207	
	383	135.60	5,022	22,125	173,207	

LEAD-ZINC ORE

County	Ore, tailings, etc.	Gold	Silver	Copper	Lead	Zinc
Los Angeles	24,939		68,362		1,159,600	2,523,650
Orange	201	2.88	1,550		5,127	40,000
San Diego	22	3.74	396		3,173	4,000
	25,162	6.62	70,308		1,167,900	2,567,650

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[10] Includes 1,742 tons of tailings.

METALLURGIC INDUSTRY

The quantity of ore treated at gold and silver mills by amalgamation and cyanidation in 1926 was 675,095 tons, a decrease of 4 per cent as compared with the ore treated by mills in 1925. Bullion saved at amalgamation mills carried 87 per cent of the gold and 13 per cent of the silver, and cyanide precipitates carried 13 per cent of the gold and 87 per cent of the silver recovered by treatment of ores at gold and silver mills in 1926.

Gold and silver mills, in addition to ores, treated 800 tons of tailings by amalgamation and 1,500 tons by cyanidation, which yielded 152.11 ounces of gold and 2,496 ounces of silver, and 105.25 ounces of gold and 38 ounces of silver were cleaned up about amalgamation mills.

Cyanide plants treated 5,273 tons of concentrates in 1926 as compared with 6,032 tons in 1925, a decrease of 759 tons.

Concentrates produced in 1926 at gold and silver mills in which the ore was first amalgamated amounted to 6,633 tons and yielded 26,797.33 ounces of gold, 7,509 ounces of silver, and 1,151 pounds of lead at cyanidation works or smelters.

Concentrating mills in 1926 treated 919,190 tons of ore, an increase of 4 per cent as compared with 1925. Concentrates produced, including those made at gold and silver mills, amounted to 94,994 tons, a decrease of 2 per cent as compared with 1925. The quantity of dry gold concentrates fell off 3,243 tons, or 33 per cent; dry silver concentrates declined 4,225 tons, or 58 per cent; copper concentrates decreased 5,489 tons, or 8 per cent; but lead concentrates increased 1,143 tons, or 719 per cent, and zinc concentrates increased 9,976 tons, or 91 per cent, as compared with 1925.

The quantity of crude ore shipped to smelters in 1926 was 63,651 tons, which was 104,212 tons, or 62 per cent, less than in 1925. The greatest decreases were in copper ore, 78,101 tons; zinc ore, 12,761 tons; dry gold ore, 8,937 tons; and lead ore, 4,118 tons.

Miscellaneous materials classed as tailings, which were treated by cyanidation, amalgamation, leaching, and smelting, in 1926 amounted to 102,923 tons as compared with 178,532 tons in 1925. The yield from tailings and mine water in 1926 was 358.14 ounces of gold, 13,222 ounces of silver, 1,721,540 pounds of copper, and 349,323 pounds of lead, having a total value of $284,616, as compared with 8,328.47 ounces of gold, 58,725 ounces of silver, and 1,666,274 pounds of copper, having a total value of $449,531, in 1925.

Metallurgic recovery of metals in California, 1925 and 1926, by methods of recovery

Method of recovery	Material treated	Gold	Silver	Copper	Lead	Zinc	Total value of metal
1925	*Short tons*	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*	
Ore amalgamated [1]	690,443	277,918.37	61,568				$5,787,811
Ore cyanided	14,219	35,783.18	71,768				789,511
Concentrates cyanided	6,032	17,616.54	4,696				367,425
Tailings amalgamated	100	199.56	84				4,183
Tailings cyanided	86,070	8,005.18	53,440				202,569
Ore smelted	167,863	12,395.03	465,040	13,899,970	6,400,643	5,415,555	3,521,200
Concentrates smelted	90,800	33,467.76	2,374,040	31,298,669	165,557	6,073,682	7,259,838
Tailings smelted	92,362	123.73	5,201	[2] 1,666,274			242,779
		385,509.35	3,035,837	46,864,913	6,566,200	11,489,237	18,175,316
1926							
Ore amalgamated [1]	629,734	241,144.56	45,694				5,013,414
Ore cyanided	45,361	36,788.29	303,701				949,990
Concentrates cyanided	5,273	18,735.50	4,423				390,058
Tailings amalgamated	800	103.23	2,091				3,439
Tailings cyanided	1,500	154.13	443				3,464
Ore smelted	63,651	5,321.23	286,411	3,099,167	5,855,224	83,027	1,197,248
Concentrates smelted	89,721	21,526.69	1,349,647	28,645,592	1,888,966	20,350,860	6,974,990
Tailings smelted	100,623	100.78	10,688	[2] 1,721,540	349,323		277,713
		323,874.41	2,003,098	33,466,299	8,093,513	20,433,887	14,810,316

[1] Includes gold and silver from "high grade" as follows: 1925, 23,451.64 ounces of gold and 5,389 ounces of silver; 1926, 20,687.89 ounces of gold and 3,798 ounces of silver.

[2] Includes copper from mine water.

Mine production of metals from gold and silver mills in California in 1926, by counties

County	Ore, tailings, etc., treated		Recovered in bullion				
			Amalgamation		Cyanidation		
	Ore	Tailings, etc.	Gold	Silver	Gold	Silver	Total value
	Short tons	*Short tons*	*Fine ounces*	*Fine ounces*	*Fine ounces*	*Fine ounces*	
Amador	280, 502		90, 209. 45	17, 843			$1, 875, 929
Butte	9, 721		151. 52	32	2, 742. 39	3, 740	62, 176
Calaveras	96, 870		14, 396. 89	1, 875	186. 75	193	302, 761
Eldorado	2, 470		3, 778. 58	673			78, 530
Fresno	202		47. 86	24			1, 004
Inyo	2	1, 000	10. 15	10	39. 46	54	1, 067
Kern	17, 277		5, 461. 09	1, 495	1, 081. 27	5, 764	139, 773
Los Angeles	10		4. 53				94
Madera	62		73. 79	34			1, 546
Mariposa	11, 451		8, 370. 97	2, 040	2. 11		174, 360
Modoc	10		7. 62	5			161
Mono	10, 706	500	17. 86	5	853. 02	191, 192	137, 310
Monterey	50		34. 13	5			709
Napa	3, 400				346. 17	70, 268	51, 003
Nevada	184, 924		79, 984. 84	14, 527	30, 608. 46	32, 525	2, 315, 526
Placer	992		1, 190. 73	214			24, 749
Plumas	2, 021		889. 87	101			18, 458
Riverside	1		3. 10	1			65
San Bernardino	1, 090	800	453. 70	2, 159	14. 66	4	11, 032
San Diego	1, 445		491. 13	143	9. 40	3	10, 438
Shasta	574		908. 62	166			18, 887
Sierra	27, 625		25, 834. 95	4, 525			536, 878
Siskiyou	1, 349		4, 906. 70	814			101, 938
Trinity	3, 391		600. 88	260			12, 583
Tuolumne	18, 950		3, 418. 83	834	1, 058. 73	401	93, 330
	675, 095	2, 300	[1] 241, 247. 79	[1] 47, 785	36, 942. 42	304, 144	5, 970, 307
Total, 1925	704, 662	86, 170	[1] 278, 117. 93	[1] 61, 652	43, 788. 36	125, 208	6, 784, 075

County	Concentrates and recovered metal						
	Concentrates produced	Gold	Silver	Copper	Lead	Zinc	Total value of metal
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*	
Amador	3, 342	14, 099. 93	3, 585		825		$293, 774
Calaveras	2, 680	9, 977. 59	2, 103				207, 567
Eldorado	4	17. 90	11				377
Mariposa	55	262. 56	279				5, 602
Nevada	239	937. 70	977				19, 994
Plumas	3	28. 88	22		326		637
Sierra	69	619. 77	64				12, 852
Tuolumne	241	853. 00	468				17, 925
	6, 633	26, 797. 33	7, 509		1, 151		558, 728
Total, 1925	9, 906	33, 649. 75	9, 103				701, 919

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[1] Includes gold and silver from "high grade" as follows: 1926, 20,687.89 ounces of gold and 3,798 ounces of silver; 1925, 23,451.64 ounces of gold and 5,389 ounces of silver.

Mine production of metals from concentrating mills in California in 1926, by counties

County	Ore to concentrating mills	Concentrates and recovered metal						
		Concentrates produced	Gold	Silver	Copper	Lead	Zinc	Total value of metal
	Short tons	*Short tons*	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*	
Calaveras	116, 570	17, 949	93. 64	4, 666	4, 603, 948			$649, 401
Inyo	14, 664	834	24. 59	25, 739	2, 000	726, 973		75, 007
Kern	30	3	1. 64	153				129
Los Angeles	24, 939	3, 766		68, 362		1, 159, 600	2, 523, 650	324, 700
Mariposa	200	20	64. 71	86				1, 391
Mono	60	3	15. 35	40	1, 350			531
Orange	200	25	2. 54	1, 253		929	30, 000	3, 159
Placer	30	4	11. 62	2				241
Plumas	671, 700	45, 061	9, 195. 09	346, 481	22, 163, 035			3, 509, 108
San Bernardino	33, 744	3, 085	3, 074. 80	749, 700	29	313		531, 404
Shasta	56, 928	17, 606	950. 99	150, 053	1, 875, 230		17, 797, 210	1, 710, 615
Siskiyou	75	3	17. 16	23				369
Trinity	50	2	12. 73	3				265
	919, 190	88, 361	13, 464. 86	1, 346, 561	28, 645, 592	1, 887, 815	20, 350, 860	6, 806, 320
Total, 1925	887, 622	86, 926	17, 434. 55	2, 369, 633	31, 298, 669	165, 557	6, 073, 682	6, 925, 344

Mine production of metals from California concentrates in 1926

BY COUNTIES

	Concentrates	Gold	Silver	Copper	Lead	Zinc	Total value of metal
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*	
Amador	3, 342	14, 099. 93	3, 585		825		$293, 774
Calaveras	20, 629	10, 071. 23	6, 769	4, 603, 948			856, 968
Eldorado	4	17. 90	11				377
Inyo	834	24. 59	25, 739	2, 000	726, 973		75, 007
Kern	3	1. 64	153				129
Los Angeles	3, 766		68, 362		1, 159, 600	2, 523, 650	324, 700
Mariposa	75	327. 27	365				6, 993
Mono	3	15. 35	40	1, 350			531
Nevada	239	937. 70	977				19, 994
Orange	25	2. 54	1, 253		929	30, 000	3, 159
Placer	4	11. 62	2				241
Plumas	45, 064	9, 223. 97	346, 503	22, 163, 035	326		3, 509, 745
San Bernardino	3, 085	3, 074. 80	749, 700	29	313		531, 404
Shasta	17, 606	950. 99	150, 053	1, 875, 230		17, 797, 210	1, 710, 615
Sierra	69	619. 77	64				12, 852
Siskiyou	3	17. 16	23				369
Trinity	2	12. 73	3				265
Tuolumne	241	853. 00	468				17, 925
	94, 994	40, 262. 19	1, 354, 070	28, 645, 592	1, 888, 966	20, 350, 860	7, 365, 048
Total, 1925	96, 832	51, 084. 30	2, 378, 736	31, 298, 669	165, 557	6, 073, 682	7, 627, 263

BY KINDS OF CONCENTRATES

Dry gold	6, 663	26, 908. 18	7, 627		1, 151		$561, 093
Dry silver	3, 087	3, 070. 04	749, 843				531, 365
Copper	63, 012	9, 299. 45	351, 183	26, 768, 333			4, 158, 942
Lead	1, 302	30. 99	74, 317	2, 029	1, 194, 096		142, 827
Zinc	20, 930	953. 53	171, 100	1, 875, 230	693, 719	20, 350, 860	1, 970, 821
	94, 994	40, 262. 19	1, 354, 070	28, 645, 592	1, 888, 966	20, 350, 860	7, 365, 048

AVERAGE RECOVERABLE CONTENT

	Short tons	*Fine ounces per ton*	*Fine ounces per ton*	*Per cent*	*Per cent*	*Per cent*	*Value per ton*
Dry gold	6, 663	4. 04	1. 14		0. 01		$84. 21
Dry silver	3, 087	. 99	242. 90				172. 13
Copper	63, 012	. 15	5. 57	21. 24			66. 00
Lead	1, 302	. 02	57. 08	. 08	45. 86		109. 70
Zinc	20, 930	. 05	8. 17	4. 48	1. 66	48. 62	94. 16
	94, 994	. 42	14. 25	15. 08	. 99	10. 71	77. 53
Total, 1925	96, 832	. 53	24. 57	16. 16	. 09	3. 14	78. 77

Mine production of metals from California crude ore shipped to smelters in 1926

BY COUNTIES

	Ore	Gold	Silver	Copper	Lead	Zinc	Total value of metal
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*	
Amador	7	221.60	46	----------	----------	----------	$4,610
Calaveras	6,034	21.45	657	627,799	----------	----------	88,745
Imperial	19	11.49	31	282	361	----------	325
Inyo	13,879	1,222.18	90,958	28,446	5,480,514	69,027	529,623
Kern	3	.60	61	----------	----------	----------	50
Mono	131	91.12	3,320	913	20,905	----------	5,756
Napa	241	31.96	10,848	----------	----------	----------	7,430
Orange	1	.34	297	----------	4,198	10,000	1,278
Plumas	----------	3.52	2	----------	----------	----------	74
Riverside	384	138.67	5,023	22,125	173,207	----------	22,956
San Bernardino	6,231	1,566.79	132,170	176,890	168,903	----------	153,139
San Diego	27	4.90	399	----------	3,173	4,000	904
Shasta	19,659	747.75	23,803	1,479,970	3,963	----------	237,823
Sierra	1	5.17	1	----------	----------	----------	108
Siskiyou	----------	256.30	24	----------	----------	----------	5,313
Trinity	17,008	995.79	18,761	760,410	----------	----------	138,749
Tuolumne	25	----------	10	2,332	----------	----------	332
Yuba	1	1.60	----------	----------	----------	----------	33
	63,651	5,321.23	286,411	3,099,167	5,855,224	83,027	1,197,248
Total, 1925	167,863	12,395.03	465,040	13,899,970	6,400,643	5,415,555	3,521,200

BY KINDS OF ORE

	Ore	Gold	Silver	Copper	Lead	Zinc	Total value of metal
Dry gold	4,681	2,043.83	6,479	119,846	2,840	----------	$63,298
Dry silver	1,121	308.51	136,637	714	679	----------	91,792
Copper	43,263	1,836.42	43,050	2,930,241	687	----------	475,114
Lead	14,029	992.79	94,530	26,241	5,663,745	----------	536,283
Zinc	151	----------	----------	----------	6,695	69,027	5,713
Lead-copper	383	135.60	5,022	22,125	173,207	----------	22,892
Lead-zinc	23	4.08	693	----------	7,371	14,000	2,156
	63,651	5,321.23	286,411	3,099,167	5,855,224	83,027	1,197,248

AVERAGE RECOVERABLE CONTENT

	Short tons	*Fine ounces per ton*	*Fine ounces per ton*	*Per cent*	*Per cent*	*Per cent*	*Value per ton*
Dry gold	4,681	0.44	1.38	1.28	0.03	----------	$13.52
Dry silver	1,121	.28	121.89	.03	.03	----------	81.88
Copper	43,263	.04	1.00	3.39	----------	----------	10.98
Lead	14,029	.07	6.74	.09	20.19	----------	38.23
Zinc	151	----------	----------	----------	2.22	22.86	37.83
Lead-copper	383	.35	13.11	2.89	22.61	----------	59.77
Lead-zinc	23	.18	30.13	----------	16.02	30.43	93.74
	63,651	.08	4.50	2.43	4.60	.07	18.81
Total, 1925	167,863	.07	2.77	4.14	1.91	1.61	20.98

REVIEW BY COUNTIES

ALPINE COUNTY

No mine reported production in Alpine County in 1926, but some development was under way in the Hope Valley, Mogul, and Monitor districts.[4]

AMADOR COUNTY

Amador County ranked fifth in 1926; the total output of the 15 lode mines and 10 placers that were producers was valued at $2,180,763, a decrease of $173,461 as compared with 1925. Young [5] gave some details concerning developments along the Mother Lode in Amador County.

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[4] Henry, J. L., "Silver-gold deposits of Alpine County, Calif.": Eng. and Min. Jour.-Press, vol. 121, June 5, 1926, p. 936.

[5] Young, G. J., "Mother Lode district of California still active": Eng. and Min. Jour.-Press, vol. 121, Apr. 24, 1926, pp. 696–697.

At Jackson the 204,921 tons of ore produced at seven properties yielded 67,823.58 ounces of gold and 14,136 ounces of silver. The Kennedy, whose shaft is now 4,614 feet deep, Argonaut, Moore, Sunset, Amador Queen No. 2, Climax, and Valparaiso were productive. The Kennedy mine installed electric power for its hoist, and at the Sunset mine a five-stamp mill was put up and the mine was electrified. At the Moore the shaft was sunk 600 feet to the 1,800-foot level, where 1,000 feet of development was done.

In the Pine Grove district the Amador Columbus lode mine and the Ludekens and Mitchell hydraulic mines produced 169.70 ounces of gold and 38 ounces of silver.

The Plymouth mine began milling in September, 1926, after several months of development work, and was the only active property near the town of Plymouth. In the Sutter Creek district the Central Eureka mine was the only producing mine, its shaft, sunk on an incline of 70°, is now 4,700 feet deep. Some work was under way on the North Star mine north of town, and two mill clean-ups were made. The total production of the district was 27,177.65 ounces of gold and 4,743 ounces of silver.

In the Volcano district the Cleveland drift, Elephant and Union Flat hydraulic, and four sluice mines produced 236.94 ounces of gold and 23 ounces of silver. The Haverly, Mountain King, Marklee, and Newman lode mines treated 1,466 tons of ore and produced 134.73 ounces of gold and 34 ounces of silver.

BUTTE COUNTY

The total production of 33 placer mines and 3 lode mines in Butte County in 1926 was valued at $290,850 as compared with $359,750 in 1925. The two dredges on Feather River produced the great bulk of the yield of Butte County in 1926.

The Gold Park lode mine near Palermo and the Surcease and Triumph lode mines near Yankee Hill milled 9,721 tons of ore that had a total value of $62,176 in gold and silver. Latham & Goble closed down and abandoned the Surcease mine September 1, 1926. The Triumph was worked by lessees in 1926, but reverted to the Triumph Gold Mining Corporation late in the year.

The Kelly Hill, Dix, and Bader drift placers on Butte Creek produced 120.65 ounces of gold and 10 ounces of silver. There were 27 small sluice operations at Cherokee, Isaiah, Oroville, and Pulga, at which 774.19 ounces of gold and 73 ounces of silver were produced in 1926. Development was continued on the Robbers Roost and Royal drift mines near De Sabla.

CALAVERAS COUNTY

The total yield of gold, silver, and copper in Calaveras County in 1926 was valued at $1,316,821, as compared with $1,355,622 in 1925, and was produced by 24 placer mines and 18 lode mines.

In the Altaville-Angels Camp area one drift mine, four sluicing operations, and a small lode mine produced 539.64 ounces of gold and 63 ounces of silver. The largest producer was the Calmo drift mine.

At Campo Seco the Penn mine was closed, but a small clean-up of copper-bearing materials was shipped from about the smelter. The Finnegan and Carson Hill mines on Carson Hill were productive. The main entry and mills of the Carson Hill Gold Mines (Inc.) at Melones were closed in December.

Near Copperopolis the Calaveras Copper Co., the Gold Knoll Mining Co., and the Royal mine (worked by lessees) produced 124,473 tons of ore, most of which was copper sulphide, that yielded 501.08 ounces of gold, 5,521 ounces of silver, and more than 5,200,000 pounds of copper. The Calaveras Copper Co.'s 400-ton flotation plant treated 116,560 tons of ore and the smelter handled 6,013 tons of ore and 17,948 tons of concentrates during 1926. The Isabel dredge, near Jenny Lind on Calaveras River, was in operation throughout the year.

The Union and Blue Lead drift mines near Mokelumne Hill were productive and considerable development work was done on the Boston Consolidated lode mine and the Chile Gulch placer. At Murphy a new cyanide plant at the Treasure mine was running several months, and the Collier mine produced a few tons of gold ore. The shaft at the Oro y Plata was cleared out. At Mountain Ranch the Glenn hydraulic mine had water for a short run. Near Railroad Flat the Comet lode mine, which was under development, milled a few tons of ore, and the Boyer placer was worked in a small way. Near San Andreas the Eighty-three, Hageman, and five small sluice placer mines produced 57.41 ounces of gold and 7 ounces of silver. The Enterprise and Old Stiff drift mines near Vallicita were active throughout the year.

In the Washington district 1,200 tons of gold ore was milled from the Washington and Old Calaveras mines, both of which were shut down late in the winter.

Near Westpoint the Bee Tree, Carlton, Foltz, and Forest Creek lode mines milled 154 tons of ore, which yielded 102.20 ounces of gold and 25 ounces of silver. At the Wickham mine the Caloro Mining Co. installed a cyanide mill which will be a custom mill and will also handle the company's ores.

The Demarest mine at Fourth Crossing was bonded late in the year and its unwatering started. The Thorpe and Backman mines at the same place were bonded to the Kirby Development Corporation.

DEL NORTE COUNTY

The placer production in Del Norte County in 1926 from four sluice mines and one hydraulic amounted to 52.17 ounces of gold and 6 ounces of silver, valued at $1,082. The largest yield was from sluicing operations at Craigs Creek and from the Myrtle Creek hydraulic near Crescent City.

ELDORADO COUNTY

The value of gold and silver produced by 39 placer mines and 18 lode mines in Eldorado County in 1926 was $92,261 as compared with $40,450 in 1925.

Near Eldorado the Martinez and Red Wing lode mines and a sluice operation were producing. At Garden Valley the Bathurst and Frog Pond lodes were worked. Near Georgetown the Lucky Boy drift placer and five sluice mines produced 44.21 ounces of gold and 7 ounces of silver, and the McPherson lode mine treated 30 tons of $20 ore.

Near Greenwood the Grit, Hines Gilbert, Oro Fino, and Wild Cat lode mines milled 111 tons of ore, from which 94.25 ounces of gold and 20 ounces of silver were recovered. Several hundred feet of development work was done on the 480-foot level of the Sliger mine. At Grizzly Flat the Humbug and Mount Pleasant lode mines milled 45 tons of $15 ore. Near Indian Diggings the Yellow Jacket drift mine was worked with good success and the Everhope sluice placer had a small production. The Coster lode mine and the Jackass, Jay Hawk, and three sluice placers at Pilot Hill made a total production of 108.46 ounces of gold and 37 ounces of silver. Near Placerville the Paymaster and Smith lode mines milled 90 tons of ore, carrying nearly an ounce of gold per ton; the Hook and Ladder, the most productive drift mine in the county, was worked by the W. P. Hammon interests.

The Pyramid and Vandalia lode mines near Shingle milled 150 tons of fair grade gold ore.

FRESNO COUNTY

The total output of gold and silver from Fresno County mines in 1926 was valued at $8,647, which was produced at 11 placer mines and 4 lode mines. This is a decrease of $16,560 as compared with 1925.

Near Auberry the Munroe, X Ray, and three sluice mines produced 30.17 ounces of gold and 7 ounces of silver. The White Cross lode mine near Dunlap was under development. Over 175 ounces of gold was saved as a by-product by the Service Rock Co. of Fresno, and the Grant Rock & Gravel Co. near Friant saved a by-product of nearly $3,000 in gold. The Independence lode mine near Piedra milled 20 tons of low-grade gold ore, and the Kings River mine near Sanger treated more than 180 tons of gold ore.

HUMBOLDT COUNTY

In 1926, three hydraulic mines and three sluice mines near Orleans in Humboldt County made the total output of 60.14 ounces of gold and 10 ounces of silver, valued at $1,249, as compared with 635.75 ounces of gold and 90 ounces of silver, valued at $13,204, in 1925. The chief producers in 1926 were the Orcutt, Little Klondyke, and Nelson hydraulic mines.

IMPERIAL COUNTY

The Good Luck and Gun Sight lode mines near Ogilby and the Shiner mine near Picacho produced 19 tons of ore in 1926 that yielded 11.49 ounces of gold, 31 ounces of silver, 282 pounds of copper, and 361 pounds of lead, having a total value of $325.

INYO COUNTY

The 33 producing lode mines in Inyo County in 1926 made a total output of 31,287 tons of ore and tailings having a total value in metals of $639,444, as compared with 18,126 tons of ore and $718,523 in metals in 1925. Ninety-nine per cent of the ore produced in the county in 1926 was lead ore.

The Big Horn mine at Ballarat shipped more than 350 tons of lead ore, and more than 70 tons of gold ore was milled at the Cleveland mine near Big Pine and the McMillan mine near Bishop. Several hundred feet of development on the Reed Flat mine, 14 miles from Bishop, disclosed a body of lead-silver ore. At Cerro Gordo the Cerro Gordo, Estelle, Morning Star, Santa Rosa, and Silver Reef mines shipped 1,387 tons of lead and zinc ores and nearly 900 tons of slag that yielded 82.87 ounces of gold, 27,191 ounces of silver, 20,480 pounds of copper, 643,904 pounds of lead, and 39,345 pounds of zinc. In the Darwin district five mines shipped 15,018 tons of lead ore and nearly 860 tons of slag which when smelted yielded a total of 31.97 ounces of gold, 34,579 ounces of silver, 4,324 pounds of copper, and 1,036,512 pounds of lead. One mine in the district shipped a small tonnage of silver ore. The largest producer near Darwin was the American Metals (Inc.) (Darwin mine); the mill was rebuilt and both gravity and flotation concentrates were shipped.

In the vicinity of Trona in the Slate Range district six mines produced 6,051 tons of lead and gold ore that yielded 320.96 ounces of gold, 24,161 ounces of silver, 3,367 pounds of copper, and 3,136,750 pounds of lead. The largest producers were the Ophir and Slate Range mines, the latter having been worked for a while by the Nevada Hills Mining Co. (Reorganized); smaller shipments were made from the Belcher, Lead and Bluff, O'Neil, and Peggy mines. The Reorganized Silver King Divide Mining Co. was developing the Silver King mine in the Slate Range district. The Engineers Exploration Corporation, operator of the Ophir group, completed metallurgical tests of mill-grade ore and plans were made for a reduction plant.

The Tecopa Consolidated Mining Co. at Tecopa was a large producer of lead and shipments of lead and zinc ore were made from the Collina mine, 17 miles northeast of Shoshone. Shipments of lead ore were made from the La Moine mine, 19 miles southwest of Beatty, Nev. The Carbonate and Queen of Sheba mines, 40 miles west of Shoshone, were under further development by the Reorganized Victory Divide Mining Co. of Goldfield, Nev.

KERN COUNTY

Kern County in 1926 had 27 producing lode mines and 1 placer. The total output of the county was 17,310 tons of ore which yielded 6,544.60 ounces of gold and 7,473 ounces of silver, and 10.58 ounces of placer gold that carried also 6 ounces of silver. The total metal yield in 1926 was valued at $140,175 as compared with $143,038 in 1925. The largest operation in the county was at the Zenda mine in the Amalie district, at which nearly 8,000 tons of silver ore carrying some gold was treated at the 150-ton cyanide mill. About 15 tons of gold ore was milled in the Isabella district from the Buena Vista and Kern River mines. In the Mojave district the Nancy Dare, Waldorf, and Yellow Dog mines produced 1,813 tons of ore that yielded 320.46 ounces of gold and 441 ounces of silver.

In 1926 there was considerable activity in the Randsburg district, and 12 mines (including the Ben Franklin, Big Butte, King Solomon, Windy, and Yellow Aster, which produced over 100 tons of ore each) milled a total of 5,150 tons of ore that yielded 5,187.47 ounces of gold and 1,353 ounces of silver.

At Rosamond the Last Chance, Piute, and Tropico mines produced 2,295 tons of ore that yielded 828.51 ounces of gold and 689 ounces of silver, most of which was recovered by cyanidation at the Tropico mill. A 25-ton lot of gold ore was shipped from Tehachapi.

LASSEN COUNTY

A small shipment of placer bullion produced in Lassen County was shipped from Susanville in 1926.

LOS ANGELES COUNTY

The Monte Cristo mine near Acton was a small producer in 1926. The lead-zinc mines on Catalina Island produced virtually all of the metal output of Los Angeles County in 1926. The total output of the county was 24,949 tons of ore, yielding 4.53 ounces of gold, 68,362 ounces of silver, 1,159,600 pounds of lead, and 2,523,650 pounds of zinc, having a total value of $324,794 as compared with an output of the same metals valued at $44,130 in 1925.

MADERA COUNTY

Three gold lodes near O'Neals, the Casady View, Riverside, and White Rock mines, in 1926 milled 62 tons of ore yielding 73.79 ounces of gold and 34 ounces of silver, valued at $1,546. Two placer mines near Hildreth produced 8.83 ounces of gold and 1 ounce of silver, valued at $184, making a county total of $1,730 in 1926 as compared with $2,448 in 1925.

MARIPOSA COUNTY

The mine production of Mariposa County in 1926 was 8,819.38 ounces of gold and 2,433 ounces of silver, which had a total value of $183,831 as compared with $194,568 in 1925. The 1926 output came from 19 lode mines and 14 small sluice operations on Merced River near Bagby and Briceburg and from Coulterville and Mariposa.

Near Bagby the Jumper, Platinum King, and Specimen Queen mines produced 143 tons of ore, yielding 190.55 ounces of gold and 75 ounces of silver. The Gray Eagle mine near Bagby was further developed but made no production. The Yellow Metal group at Briceburg was under development and a mill was erected. The Original and White Oak mines at Clearinghouse milled more than 10,730 tons of ore, the former being the largest producer in the county. The Argo and Philip Garnin properties at Coulterville and the Ruth Pierce mine near Hornitos milled 72 tons of ore yielding 60.73 ounces of gold and 19 ounces of silver. The Number Nine mine was unwatered by Oakland capital. In the vicinity of Mariposa the Miller and Rumley, North Star, Recorder and Rex, Sebastopol, Spread Eagle, Washington, and Whitlock mines produced 496 tons of ore yielding 298.02 ounces of gold and 55 ounces of silver. Some development work was carried on at the Feliciana mine, and a clean-up was made from the old mill plates. At the Princeton mine at Mount Bullion over 500 feet of development work was done and a few tons of ore sorted from the dumps was milled during 1926.

MODOC COUNTY

Ten tons of gold ore was milled at the Brush Hill mine in the Hayden Hill district in 1926; it yielded bullion valued at $161.

MONO COUNTY

In 1926 there were 11 producing lode mines in Mono County and no productive placers. The total output of the county was 11,397 tons of ore yielding 977.35 ounces of gold, 194,557 ounces of silver, 2,263 pounds of copper, and 20,905 pounds of lead, having a total value of $143,597, as compared with 110 tons with metals valued at $8,442 in 1925. In the Blind Spring Hill district, north of Benton, the Joseph Main silver mine, Sierra Vista copper mine, the McLeod and Henry gold mine, and the Mahle, St. Ives, and Comanche lead mines shipped 147 tons of ore yielding 50.46 ounces of gold, 3,194 ounces of silver, 2,263 pounds of copper, and 20,905 pounds of lead. Tailings were cyanided at the Standard mill at Bodie. Lessees shipped 544 tons of high-grade gold ore from the Chemung and Serita mines at Masonic. The Log Cabin mine near Mono Lake post office shipped 30 tons of gold ore. The largest producer in the county was the Silverado silver mine, west of Sweetwater, Nev., operated by the Mono Mining Co. of Nevada. The new cyanide mill started in 1926, after more than a year of preparatory work in the mine, but closed in December.

MONTEREY COUNTY

One lot of bullion was shipped from the Gorda district on the coast west of King City.

NAPA COUNTY

The Palisades Mines Co. treated 3,400 tons of silver ore at the cyanide plant on the Grigsby mine north of Calistoga.

NEVADA COUNTY

In 1926 there were 19 placer mines and 16 lode mines that reported production. The total yield of the county in 1926 was 184,924 tons of ore, 112,174.19 ounces of gold and 48,101 ounces of silver, having a total value of $2,348,861 as compared with $2,337,762 in 1925.

Among the placer mines that were productive in 1926 the Quaker Hill drift at Nevada City was the largest producer; it was followed by the Baltic drift at Rough and Ready, Golden Eagle drift at Graniteville, and the You Bet at You Bet which was drifted in 1926. Less than 10 ounces of bullion was recovered at North Bloomfield placers.

The North Star, Empire, Idaho-Maryland, Brunswick, Golden Center, Hermitage, Mitchell, and Williams gold lode mines at Grass Valley milled 182,429 tons of ore, which yielded 99,799.82 ounces of gold and 45,837 ounces of silver. The Brunswick was allowed to fill with water in July, and operations at the Hermitage ceased about the same time. Work was stopped at the Golden Center in March. The Idaho-Maryland, which was entirely rejuvenated, was worked throughout the year, as was the Empire mine. The annual report of the North Star Mines Co. states that—

> the production of the North Star mine was $743,047.94, with outlays for current operation amounting to $714,662.22. The total amount spent for development was $414,833.53. * * *
>
> The year's output came chiefly from rock mined on and between the 6,000 and 7,500 levels of the so-called X and No. 2 veins. A total of 120,367 tons was delivered to the sorting plant, of which 25,767 tons was discarded as waste, leaving 94,600 tons crushed, with an average yield of $7.86 per ton crushed, at an average cost of $7.56 for operating and $1.45 for development, making an aggregate cost of $9.01 per ton and resulting in a loss of $1.15 per ton. The yield per ton in 1926 was 33 cents less, and the cost 47 cents more, than in the previous year. Included in the above tonnage was about 18,000 tons of rock mined in the course of development, most of it of little value, which tended to reduce the general average yield of the ore milled.
>
> Of the total production of the year 68.98 per cent was obtained in the mill by amalgamation, while 31.02 per cent was recovered by cyanidation. It is estimated that the value lost in the tailings was about 37 cents per ton crushed.
>
> Exploration work was actively continued throughout the year, particularly in the carrying out of the project for the development of the mine in depth. The vertical shaft was sunk 1,036 feet and the No. 1 incline shaft 865 feet, and about the middle of November these two shafts were connected at a vertical depth of 3,500 feet and a depth on the incline of about 8,600 feet. The station at the junction of the two shafts is now completed and pumping and other equipment installed, and it is expected that hoisting through the vertical shaft will be started within the next few days. Sinking of the No. 2 incline shaft was continued for 60 feet and then suspended, it being the intention to make connection with this shaft by upraise from the 8,600 level. Lateral development of the X and No. 2 veins was advanced by drifts and raises on various levels between the 6,600 and 7,500. The total development work during the year amounted to 14,010 feet (shafts 1,961 feet, drifting 9,951 feet, raising 1,915 feet, and cross-cutting 183 feet). The result of the work so far accomplished toward the development of the mine down to the 8,600 level is fairly encouraging, inasmuch as the veins have been shown to continue in depth, carrying at times ore of fair and occasionally good quality, although it can not be said that any very extensive ore bodies have yet been proved. During the last four months of the year the ore averaged $10 per ton, and while the average for the year was only $7.86 per ton this was partly due to the inclusion of development rock, and to generally poor operating conditions, which made clean and selective mining difficult.

A description of mining methods used at the North Star mine was published in 1926.[6]

At Nevada City the Nevada City, Champion, Graham, and Queen Lil mines produced 2,007 tons of ore which milled 1,000.68 ounces of gold and 378 ounces of silver. The mill at the Nevada City mine was finished in April, but the mine and mill were closed in September. The Champion mine was worked by Dr. C. P. Jones until September when it was taken over by the Belmont Uncle Sam Mining Co.

The Twin Sisters mine near North Bloomfield was a small producer, as were the Fippin and Osceola mines near Rough and Ready. The Eagle Bird mine at Washington milled 400 tons of gold ore.

ORANGE COUNTY

A small production of lead-zinc ore was made at the Blue Light mine east of Fullerton in 1926.

PLACER COUNTY

In Placer County 6 lode mines and 59 placers contributed to the output of gold and silver in 1926. Of the placer operations 24 were drift mines, 34 sluice operations, and one a dredge. These lode and placer mines yielded in all 4,011.30 ounces of gold and 554 ounces of silver, having a total value of $83,267 as compared with a bullion yield valued at $122,405 in 1925.

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[6] Fulton, J. A., and Foote, A. B., "Mining methods in Grass Valley district, Calif.": Trans. Am. Inst. Min. and Met. Eng., No. 1526-A, 1926.

The American Bar mine at Michigan Bluff was the largest producer among the lode mines; it was followed by the Annie Laurie at Colfax and the Three Queens mine at Foresthill. A small output was made by the Big Oak Tree mine at Colfax, the Seam Diggings at Foresthill, and the Big Ben at Lincoln. In all 1,022 tons of gold ore was milled in the county, which yielded 1,202.35 ounces of gold and 216 ounces of silver, valued at $24,990.

The Colfax dredge on American River was active only a part of 1926. The Trixie drift at Dutch Flat was worked by Andrew Fogarty. At Foresthill the Baltimore, worked by S. G. Bowman under lease, the Black Hawk, California, Hard Times, Paragon, and several other drift mines produced bullion yielding 220.10 ounces of gold and 36 ounces of silver. Small mine operations near Auburn and Colfax resulted in saving 114.61 ounces of gold and 18 ounces of silver that was handled through the banks. Some placer bullion was saved near Gold Run and at Iowa Hill the Gould, Pine Avenue, Star United, Twenty One, Virtle, Welcome, and several small placers saved bullion yielding 294.72 ounces of gold and 26 ounces of silver. Near Michigan Bluff the Double O, Glenn, Home Ticket, New Hope, and Sierra Nevada drift mines and five sluice operations produced 423.06 ounces of gold and 36 ounces of silver. At the plant of the Enwood Sand & Rock Co. near Roseville nearly 200 ounces of bullion was recovered as a by-product. The Diamond drift mine near Towle and the Georgia Hill drift at Yankee Jims were productive in a small way.

PLUMAS COUNTY

Plumas County mines in 1926 produced 11,980.91 ounces of gold, 347,147 ounces of silver, 22,163,035 pounds of copper, and 326 pounds of lead, having a total value of $3,567,138 as compared with $4,366,132 in 1925. In 1926 there were 14 placer mines and 9 lode mines that contributed to the total yield.

The Engels Copper Mining Co. treated more ore than any mine in the State and was followed by the Walker Mining Co. The following extracts are quoted from the thirteenth annual report of the Engels Copper Mining Co.:

PRODUCTION FOR 1926

13,344,863 pounds copper, gross value	$1, 841, 835. 44
182,940 ounces silver, gross value	107, 168. 96
1,631 ounces gold, gross value	30, 979. 79
Total gross value of production	1, 979, 984. 19

During the year 421,618 tons of ore were milled, the average copper content of which was 1.785 per cent as compared with 1.979 per cent for 1925. Actual mill recovery was 88.66 per cent, or 31.65 pounds of copper per ton ore milled. The mine has produced to the end of 1926, 121,648,888 pounds of copper. * * *

COST OF COPPER PRODUCTION

Owing to the low grade of ore milled operating cost per pound of copper was high during the year, amounting to 7.896 cents compared to 6.8010 cents for last year. Cost for freight, smelting charges, mine development, and depreciation amounted to 5.1306 cents compared to 5.2554 cents last year. The total cost per pound of copper was 13.029 cents against 12.0564 cents for 1925. Actually, the unit cost per ton of ore handled was the same, being $2.50 for this year against $2.51 last year. * * *

Pike experimental plant.—For some time past experiments were carried on in developing a process for the extraction, from concentrates, of copper, iron, gold, silver, and sulphur. A plant was equipped, located in Emeryville, Calif., and known as the "Pike experimental plant," where development of the process was carried on. While the process is feasible, the estimated cost of building a plant is so large that extensive financing would be required. Nothing has been done in this regard, and the final disposition of the entire matter is held in abeyance. * * *

General.—A vigorous campaign of diamond drilling and exploration, both surface and underground, has been inaugurated and is still maintained. While ore has been encountered in several places heretofore unexplored, more work must be done to determine the importance of these discoveries. * * *

ORE RESERVES OF DECEMBER 31, 1926

The following estimate of ore reserves represents ore that assays approximately 2 per cent in copper:

	Blocked ore		Probable ore, tons	Total tons
	Tons in place	Tons broken in stopes		
Engels mine	425, 808	186, 072	110, 380	722, 260
Superior mine	84, 800	96, 778	2, 390	183, 968
	510, 608	282, 850	112, 770	906, 228

The report of the Anaconda Copper Mining Co. for the year 1926 states with regard to the Walker mine:

> Operations at the mine were conducted throughout the year. Two hundred and twenty-three thousand eight hundred and forty tons of ore were broken. The concentrator made an average recovery of 92.685 per cent. Two hundred and fifty thousand and eighty-two tons of ore, averaging 1.872 per cent copper were treated, from which 17,889.96 tons of concentrates, averaging 24.339 per cent copper were produced. There were sold to the smelter 18,174.44 tons of concentrates and ore containing 8,818,172 pounds of copper, 162,079.77 ounces of silver, and 7,478.94 ounces of gold.

The Copper King lode at Genesee, the Arcadia at Greenville, Plumas Eureka at Johnsville, Del Monte at Seneca, the Gold Leaf and Old Harry lodes at Spring Garden, and a small mine near Blairsden milled 2,021 tons of gold ore, which yielded 922.27 ounces of gold, 125 ounces of silver, and 326 pounds of lead, valued at $19,169. The largest producer of gold ore was the Gold Leaf mine.

The chief producing placer mines in Plumas County were the Little Grizzly Creek hydraulic, north of Spring Garden, the Glazier hydraulic at Seneca, and the following drift mines: Hacop at Keddie, Marguerite at La Porte, Cameron and Sunnyside at Seneca, and the Twelve Mile Bar at Twain. The five drift mines produced bullion valued at $34,783, four hydraulic mines produced $3.170, and five sluice operations $908.

RIVERSIDE COUNTY

Three mines in Riverside County in 1926, the Gold Star near Indio, the Mileta out from Mecca (producing lead-copper ore), and the Black Hawk mine near Perris produced 385 tons of ore, which yielded 141.77 ounces of gold, 5,024 ounces of silver, 22,125 pounds of copper, and 173,207 pounds of lead, valued at $23,021. No placer mines reported production in 1926.

SACRAMENTO COUNTY

Six dredges, operated by the Natomas Co. of California, one drift mine, and three sluice operations in Sacramento County in 1926 produced a total of 63,083.24 ounces of gold and 2,607 ounces of silver, valued at $1,305,673.

The annual report of the Natomas Co. for the year ended December 31, 1926, says:

> The results of dredging operations for the year 1926 were briefly as follows:
>
> Cubic yards of material dredged 13,786,123.

Gross gold recovered	$1, 313, 920. 95
Operating costs, including taxes and insurance	884, 452. 28
Net	429, 468. 67

> The gross returns for the year averaged 9.53 cents per cubic yard which was 0.31 cent per cubic yard less than during the preceding year, while the operating costs of 6.14 cents per cubic yard were 0.03 cent per cubic yard less than during 1925.

SAN BERNARDINO COUNTY

Forty-one lode mines and six placer mines in San Bernardino County in 1926 recorded a production of 5,170.10 ounces of gold, 884,045 ounces of silver, 176,919 pounds of copper, and 169,216 pounds of lead, having a total value of $696,825 as compared with $1,543,822 in 1926.

Five dry washing operations near Randsburg and a sluice placer in Lucerne Valley yielded 60.15 ounces of gold and 12 ounces of silver, valued at $1,250.

Twelve lode mines in the county produced 5,527 tons of gold ore, 8 mines produced 34,588 tons of silver ore, 6 mines produced 579 tons of copper ore, and 14 mines produced 371 tons of lead ore. There were also 800 tons of tailings treated.

The Bagdad Chase mine near Ludlow began shipment of siliceous fluxing ore that carried gold, silver, and copper. In the Calico district gold, silver, and copper ores were produced at the Paradise, Thunderer Group, Silver Star, Telescope claims, and by C. E. Ott, the total output of the camp being 157 tons, yielding 35.01 ounces of gold, 582 ounces of silver, 115 pounds of copper, and 190 pounds of lead.

At the north end of the Providence Mountains, tributary to Cima and Nipton, 11 properties were shipping during 1926. One mine shipped copper ore, two silver ore, one gold ore, and the remainder lead ore, the total output being 159 tons of ore, from which were recovered 70.04 ounces of gold, 5,686 ounces of silver, 6,699 pounds of copper, and 47,802 pounds of lead. The principal shippers were W. P. McArthur, Louis Keiper, Voyles and Housel from the Yucca Queen mine, and the Clark Mountain Mining & Development Co.

Near Goffs the Von Trigger copper mine, now called the Run Over Consolidated, and the Oro Grande produced copper and gold ore, respectively. The Columbia mine near Kelso produced silver ore. J. E. Collins shipped lead ore and A. Hill and A. H. Cooper shipped copper ore from the Lavic district. E. A. Reinerth shipped lead ore from the Pat Maloy lode and Bruce Gatewood also shipped lead ore. The Minnehaha cyanide plant at Camp Baldy treated gold ore, and a small shipment of copper ore was made from the Mount Ontario mine.

The Ozark and Iris groups on Silver Mountain near Oro Grande were worked by the Big Ten Mining Co. and a 50-ton mill was installed.

The California Rand Silver (Uranium) and the Silver Glance mines in the Randsburg district shipped silver ore and concentrates, and the Black Hawk gold mine produced 120 tons of good ore. The mill at the California Rand was shut down on September 30, but development on the nineteenth level continued and late in the year milling was resumed. It is understood that development on the nineteenth level to the end of 1926 was disappointing but that a new ore body had been developed between the eleventh and twelfth levels.

The Arlington Mining Corporation did a large amount of development work on the Santa Fe and Black Hawk mines southeast of Victorville and treated approximately 745 tons of gold ore in a newly built amalgamation and cyanidation plant. The Eagle Mining Co. shipped 166 tons of lead ore from its property and Solomon Morris shipped 15 tons of high-grade gold ore.

The Savahai mines at Vidal produced 30 tons of gold ore before being closed down. Mr. Shorey's cyanide plant at Yermo handled 800 tons of tailings from the Sheridan and Otis mining claims.

SAN DIEGO COUNTY

One surface placer near Ramona and six lode mines in the Julian district produced bullion yielding 510.03 ounces of gold, 545 ounces of silver, 3,173 pounds of lead, and 4,000 pounds of zinc, having a total value of $11,437. The Golden Chariot mine was the largest producer of gold ore, followed by the Eagle and Granite Mountain. A shipment of lead-zinc ore was made by P. O. Gottschling. A clean-up about the Old Ready Relief mill site netted a few ounces of bullion.

SANTA CRUZ COUNTY

Nearly 8 ounces of bullion was saved in sluicing operations on the beach near Santa Cruz in 1926.

SHASTA COUNTY

In 1926 there were 2 dredges and 29 surface placers producing in Shasta County, as well as 19 lode mines. The total production of the county was 6,429.31 ounces of gold, 177,434 ounces of silver, 5,061,355 pounds of copper, 3,963 pounds of lead, and 17,797,210 pounds of zinc, having a total value of $2,287,323.

The largest operation was that of the Mountain Copper Co. at Keswick, which produced pyrite and copper ore from the Iron Mountain and Hornet mines. The California Zinc Co. worked the Baxter, Rising Star, and Bully Hill mines at Winthrop and the Afterthought mine at Ingot; all the ore produced was treated at the flotation plant at Winthrop, which made copper and zinc concentrates. The Balaklala mine at Kennett was worked under lease by the Mason Valley Mines Co.

Among the gold lode mines the Ruby Pearl at Castella, the Delta in the Delta district, the American, Evening Star, Halcyon, Milkmaid, Summit Gulch, and Red Hawk at French Gulch, and the Ballou at Igo were the more important producers. The six mines at French Gulch produced 487 tons of ore, and this ore with a shipment of bullion by Walter Reed yielded 601.08 ounces of gold and 109 ounces of silver.

The Gardella dredges, one on Clear Creek and one on Horse Creek, were the largest producers of bullion from placer mines. The Horse Creek dredge began work in October. Several small surface placers near Ono were operated and the Triangle sluice mine in the Churntown district was worked from November, 1925, to May 10, 1926, with considerable success. A large part of the placer output of Shasta County, aside from that from dredges, was saved by snipers.

SIERRA COUNTY

Twenty-two placer mines, of which 4 were drift, 3 hydraulic, and the balance small sluice properties, and 11 lode mines were productive in Sierra County in 1926. These mines produced 27,305.37 ounces of gold and 4,669 ounces of silver, having a total value of $567,365—a large decrease from the $1,382,624 of bullion produced in 1925.

A small quantity of bullion was saved by sluicing at Brandy City. Near Camptonville the Depot Hill, Indian Hill, and Snowden Hill placers produced 428.69 ounces of gold and 25 ounces of silver. Near Downieville the Black Bear and Wide Awake drift mines and six surface placers produced 255.53 ounces of gold and 29 ounces of silver. At Goodyears Bar six sluice mines produced 22.26 ounces of gold and 3 ounces of silver. The Washington mine near Sierra City operated by J. W. Thomas was one of the large placer producers in the county in 1926.

The Original Sixteen to One lode mine at Alleghany was the most productive mine in the county; other producing lode mines at Alleghany were the Eldorado Extension, Oriental, and Plumbago. The total output from lode mines in the camp was 27,561 tons of ore, that yielded 24,902.10 ounces of gold and 4,337 ounces of silver. Small clean-ups were made at the mills of the Salmon Lake mine, south of Blairsden, Golden Key, Sierra Highland, and Standard mines at Downieville, at the Brush Creek and Young America mines near Forest, and the Sierra Buttes mines at Sierra City.

SISKIYOU COUNTY

Eighty-three placer mines and 16 lode mines in Siskiyou County in 1926 produced bullion yielding 6,832.49 ounces of gold and 1,137 ounces of silver, valued at $141,949, as compared with a bullion yield of $180,951 in 1925.

The Buzzard Hill mine near Happy Camp was the most productive lode mine in the county, followed by the Morrison and Garlock mine at Fort Jones. The Mountain Lily mine at Cecilville, the Homestake and Ida May near Etna, the McKinley and Taylor mines near Fort Jones, the Herndon at Gottville, the Nickel Weight at Hilts, the

Hazel, Indian Girl, and Nigger Boy near Hornbrook, the Back Track at Humbug, and the Bone of Contention, Golden Rod, and Oregonian in the Liberty district, all contributed to the total lode output of the county, which amounted to 5,180.16 ounces of gold and 861 ounces of silver, valued at $107,620. A large amount of development work was done at the Schroeder and Golden Eagle mines near Yreka by the Sterling Gold Mining Co.

There were 35 hydraulic mines in Siskiyou County which produced 1,046.28 ounces of gold and 178 ounces of silver, valued at $21,740. Forty-eight surface placers produced 606.05 ounces of gold and 98 ounces of silver, valued at $12,589. The most productive mines were the Bennett hydraulic at Forks of Salmon, Kunz Flat at Hamburg, the Stough at Hornbrook, Gallia, John Frank, Joubert, and Anita at Sawyers Bar, Four Oaks, Mott, North Star, Matta Pass, and Quartz Hill at Scott Bar. Placer miners all reported short seasons, the best being only two to three months long and some as short as 30 to 50 days, due to low water.

STANISLAUS COUNTY

The La Grange dredge on the Tuolumne River and three sluice operations produced a total of 6,162.90 ounces of gold and 659 ounces of silver, valued at $127,809, as compared with an output valued at $172,436 in 1925.

TRINITY COUNTY

Forty-six placer mines, including 3 dredges, 5 drift mines, 28 hydraulic mines, and 10 sluicing operations, and 11 lode mines (of which all except 1 worked gold lodes) produced 23,387.90 ounces of gold, 21,275 ounces of silver, and 760,410 pounds of copper, valued at $603,204, in 1926, as compared with a metal yield valued at $494,208 in 1925.

The Trinity dredge began digging in April after the completion of a new hull. The Lewiston dredge was active throughout the year as was the Estabrook dredge near Trinity Center. The dredge production of the county in 1926 was valued at $419,974. The McDonough mine at Big Bar, the Heninger at Carrville, the Bed Rock Tunnel near Junction City, the Cobb near Lewiston, and the High Line at Hayfork, all drift mines, in 1926 produced bullion valued at $1,350.

The largest hydraulic operation in Trinity was the Lorenz at Lewiston, followed by the Jacobs at Junction City, the Nugget Bar at Minersville, the Testy Race Track at Weaverville, and Little Klondyke at Forest Glen. Most of the remaining hydraulic mines produced less than 20 ounces of gold each. The total value of bullion produced at hydraulic mines was $29,198. The 10 producing surface or sluice mines in the county yielded $1,085 in bullion.

The Island Copper Co., whose mine is in the southwest corner of Trinity County, shipped more than 17,000 tons of ore, which yielded more than 1 ounce of silver and about 0.05 ounce of gold per ton and 2 per cent of copper. At the next largest lode operation in Trinity County, the Trinity-Bonanza King mines in the Trinity Center district, operated by the United Trinity Mines, nearly 3,000 tons of ore was milled during the first half of the year. The mill closed in July because of water shortage and did not start again until

December. The Mason and Thayer mine at Dedrick, Hazel D at Denny, Rainbow at Douglas City, Enterprise and Ozark at Helena, Blue Jay and Venicia at Lewiston, and the Five Pines east of Minersville all contributed to the total lode output.

TUOLUMNE COUNTY

Seventeen placer mines, of which 3 were drift mines and 14 were surface sluice operations, and 36 lode mines contributed the total output of the county—5,798.86 ounces of gold, 1,793 ounces of silver, and 2,332 pounds of copper, valued at $121,318. The output in 1925 was valued at $156,206.

The placer mine making the largest production was the Eagle and Hawk sluice operation on the Tuolumne River; the Springfield drift mine was second; the Shaw drift near Chinese Camp was third; and the K S S placer near Tuolumne was fourth.

Among the lode mines the more important operations were the Clio Vindicator at Jamestown, the Eagle Shawmut north of Chinese Camp, which was finally closed in March, 1926, the Experimental Gulch at Columbia, the Mark Twain (Chileno) at Sonora, and the McCormick south of Chinese Camp. The smaller productive gold-lode mines were the Arizona, Eureka, Silken, Corcoran, and Simmons at Big Oak Flat, which made a total output of 84.48 ounces of gold and 19 ounces of silver; the Ham and Birney near Columbia, the Harvard, Josephine, Jumper, Mangante, Norwegian, Rawhide, and Woodfin near Jamestown, which produced 321.08 ounces of gold and 85 ounces of silver; and the Hope, McPherson, Mexican, Spring Gulch, Stewart, and Sugarman near Sonora, which produced 103.61 ounces of gold and 14 ounces of silver from 26 tons of ore. Near Tuolumne the Golden Rule, River Bend, and Volunteer produced bullion yielding 51.19 ounces of gold and 6 ounces of silver.

YUBA COUNTY

One lode mine, the Easy Money near Challenge, and 24 placer mines in Yuba County in 1926 produced bullion yielding 133,984.39 ounces of gold and 10,235 ounces of silver, valued at $2,776,090, as compared with a yield of $2,577,030 in 1925. Seven dredges, one in Garden Valley near Camptonville and six near Hammonton, produced more than 99 per cent of the total gold yield of the county.

Fourteen drift mines, most of them at Smartsville, were operated in a small way and produced 365.57 ounces of gold and 55 ounces of silver, valued at $7,591.

GOLD, SILVER, COPPER, AND LEAD IN OREGON

(MINE REPORT)

By James M. Hill[1]

SUMMARY

The value of the mine production of gold, silver, copper, and lead in Oregon in 1926 was $334,740, a decrease of 22 per cent as compared with 1925. The value of the gold declined 30 per cent and that of silver 18 per cent, but the value of copper increased 175 per cent and that of lead 89 per cent as compared with 1925. The output in 1926 came from 49 lode mines and 100 placer mines, as compared with 53 lode mines and 94 placers in 1925.

The prices given in the table that follows are those at which the values for metals in this report have been calculated. The silver prices for 1917 and 1919 are dealers' buying price, New York. For 1918, average price as stated by the Bureau of the Mint. For 1920 to 1922, New York market price for domestic silver only. For 1923, average price under the Pittman Act, from January 1 to June 2, for domestic silver; average New York price for all silver after that period. For 1924 and later years, average New York price for bar silver. The copper, lead, and zinc prices are weighted averages, for each year, of all grades of primary metal sold by producers.

Prices of silver, copper, lead, and zinc, 1917–1926

Year	Silver	Copper	Lead	Zinc	Year	Silver	Copper	Lead	Zinc
	Per fine ounce	*Per pound*	*Per pound*	*Per pound*		*Per fine ounce*	*Per pound*	*Per pound*	*Per pound*
1917	$0.824	$0.273	$0.086	$0.102	1922	$1.00	$0.135	$0.055	$0.057
1918	1.00	.247	.071	.091	1923	.82	.147	.070	.068
1919	1.12	.186	.053	.073	1924	.67	.131	.080	.065
1920	1.09	.184	.080	.081	1925	.694	.142	.087	.076
1921	1.00	.129	.045	.050	1926	.624	.140	.080	.075

Mine production of gold, silver, copper, and lead in Oregon, 1917–1926

Year	Mines producing		Ore and tailings (short tons)	Gold		Silver	
	Lode	Placer		Fine ounces	Value	Fine ounces	Value
1917	23	53	142,438	72,165.73	$1,491,798	125,656	$103,541
1918	42	78	126,681	61,458.74	1,270,465	107,323	107,323
1919	23	55	96,173	47,303.25	977,845	111,121	124,455
1920	20	47	82,156	49,221.08	1,017,490	82,743	90,190
1921	23	84	40,333	42,668.39	882,034	42,120	42,120
1922	44	126	27,522	25,714.60	531,568	151,812	151,812
1923	55	151	50,385	24,091.14	498,008	96,322	78,984
1924	43	71	44,842	26,695.36	551,842	38,103	25,529
1925	53	94	27,483	18,982.80	392,409	32,793	22,758
1926	49	100	21,727	13,243.10	273,759	29,733	18,553

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[1] Helen M. Gaylord, of the Bureau of Mines, prepared the statistics for this report.

Mine production of gold, silver, copper, and lead in Oregon, 1917–1926—Contd.

Year	Copper		Lead		Total value
	Pounds	Value	Pounds	Value	
1917	2, 474, 487	$675, 535	--------	--------	$2, 270, 874
1918	2, 451, 016	605, 401	10, 601	$753	1, 983, 942
1919	2, 214, 815	411, 955	--------	--------	1, 514, 255
1920	2, 355, 276	433, 371	--------	--------	1, 541, 051
1921	174, 300	22, 485	--------	--------	946, 639
1922	1, 046, 525	141, 281	76, 970	4, 233	828, 894
1923	1, 283, 476	188, 671	27, 523	1, 927	767, 590
1924	768, 395	100, 660	513	41	678, 072
1925	106, 325	15, 098	5, 612	488	430, 753
1926	296, 454	41, 504	11, 549	924	334, 740

Gold and silver produced at placer mines in Oregon, 1917–1926

Year	Dredge				Drift			
	Gold		Silver		Gold		Silver	
	Fine ounces	Value	Fine ounces	Value	Fine ounces	Value	Fine ounces	Value
1917	29, 940. 35	$618, 922	6, 733	$5, 548	65. 30	$1, 350	5	$4
1918	18, 756. 91	387, 740	3, 336	3, 336	360. 35	7, 449	53	53
1919	14, 355. 29	296, 750	2, 934	3, 286	63. 90	1, 321	12	13
1920	17, 360. 05	358, 864	3, 939	4, 294	--------	--------	--------	--------
1921	18, 477. 32	381, 960	3, 617	3, 617	--------	--------	--------	--------
1922	13, 060. 94	269, 994	2, 452	2, 452	58. 05	1, 200	--------	--------
1923	10, 841. 66	224, 117	1, 649	1, 352	93. 47	1, 932	13	11
1924	14, 104. 08	291, 557	2, 024	1, 356	31. 05	642	8	5
1925	6, 641. 04	137, 282	741	514	15. 96	330	3	2
1926	3, 589. 00	74, 191	378	236	253. 10	5, 232	51	32

Year	Hydraulic				Surface				Total value
	Gold		Silver		Gold		Silver		
	Fine ounces	Value	Fine ounces	Value	Fine ounces	Value	Fine ounces	Value	
1917	5, 175. 70	$106, 991	421	$347	4. 98	$103	1	$1	$733, 266
1918	4, 170. 17	86, 205	559	559	815. 36	16, 855	154	154	502, 351
1919	3, 628. 90	75, 016	671	752	365. 90	7, 564	53	59	384, 761
1920	4, 286. 22	88, 604	889	969	176. 52	3, 649	25	27	456, 407
1921	4, 272. 09	88, 312	577	577	409. 30	8, 461	97	97	483, 024
1922	2, 773. 68	57, 337	393	393	851. 69	17, 606	166	166	349, 148
1923	1, 812. 89	37, 476	321	263	640. 73	13, 245	79	65	278, 461
1924	1, 026. 99	21, 230	153	103	587. 92	12, 153	94	63	327, 109
1925	1, 337. 07	27, 640	197	137	1, 043. 31	21, 567	190	132	187, 604
1926	1, 407. 24	29, 090	218	136	689. 08	14, 245	196	122	123, 284

GOLD

Oregon mines produced 13,243.10 ounces of gold in 1926, as compared with 18,982.80 ounces in 1925, a decrease of 30 per cent. Lode mines yielded 55 per cent and placer mines 45 per cent of the total, as compared with 52 per cent and 48 per cent, respectively, in 1925. The production of gold from lode mines in 1926 was 7,304.68 ounces, a decrease of 27 per cent, as compared with 1925.

Grant County in 1926 took first place in gold production from lodes, with a total of 2,495.62 ounces, supplanting Baker County, which had held first place. Lode mines of Grant County increased their gold yield by 850.04 ounces, whereas those of Baker County yielded 2,911.74 ounces less than in 1925. Josephine County ranked third as a producer of gold from lode mines, although its production of lode gold in 1926 was 121.03 ounces less than in 1925. Jackson County gold lode mines produced 710.18 ounces less than in 1925, but Malheur County more than tripled its lode yield of gold. Lane County increased its yield of gold from lodes 29 per cent as compared with 1925.

The yield of gold from placer mines in 1926 declined 34 per cent as compared with 1925. Dredge yield decreased 46 per cent. Dredges produced 60 per cent of the total placer gold saved in 1926. Gold saved at placer mines worked by the drift method in 1926 amounted to 253.10 ounces, as compared with 15.96 ounces in 1925, and was the largest yield from drift mines since 1918. Hydraulic mines in 1926 produced 1,407.24 ounces of gold, an increase of 70.17 ounces as compared with 1925. The gold yield from surface workings in 1926 was 689.08 ounces, a decrease of 34 per cent as compared with 1925.

Grant County maintained its lead as a producer of placer gold with a production of 3,044.88 ounces, which was 708.53 ounces less than the output in 1925; a large part of the production in 1926 was saved by dredging. Baker County placer mines were second in yield of gold and those of Josephine County third.

The five largest gold-producing mines in Oregon in 1926, in order of importance, were: Empire (dredge) and Buffalo-Monitor (gold lode), in Grant County; Progressive (gold lode), in Josephine County; and Cornucopia (gold lode) and Superior (dredge), in Baker County. In 1925 the five largest gold-producing mines were the same, but in order of output they were as follows: Cornucopia (lode), Empire (dredge), Superior (dredge), Buffalo-Monitor (lode), in Baker and Grant Counties, and Progressive (lode), in Josephine County.

Fifty-one per cent of the total gold output of Oregon in 1926 came from dry gold ore, 4 per cent from copper ore, 27 per cent from dredges, 11 per cent from hydraulic mines, 5 per cent from surface placers, and 2 per cent from drift placers. Of the gold produced at lode mines 42 per cent was saved by amalgamation, 15 per cent by cyanidation, 35 per cent by smelting ore, and 8 per cent by the smelting of concentrates, most of which were flotation concentrates.

SILVER

In 1926 the mine production of silver in Oregon was 29,733 ounces, valued at $18,553, a decrease of 9 per cent in quantity and 18 per cent in value as compared with 1925. Lode mines yielded 97 per cent and placer mines 3 per cent of the total silver output in both 1925 and 1926. Gold ore yielded 74 per cent, silver ore 1 per cent, and copper ore 22 per cent of the silver produced in 1926. Five mines, with a production of over 1,000 ounces of silver each, contributed 91 per cent of the total silver yield of the State.

Grant County, with an output of 15,739 ounces of silver in 1926, was first in rank, followed by Baker County (9,061 ounces), Douglas County (2,854 ounces), and Marion County (1,354 ounces). The yield of silver from Grant County mines increased 36 per cent as compared with 1925; virtually all the yield was from the Granite, Prairie City, and Susanville-Galena districts. On the other hand, the Homestead Iron Dyke mine was not in operation until September and the Bay Horse was not productive; in consequence, the silver yield of Baker County decreased 55 per cent as compared with 1925. Mines in Douglas and Marion Counties produced a surprising quantity of silver from copper and siliceous ores. Of the 28,890 ounces of silver produced from lode mines in 1926, 70 per cent was recovered by smelting ore, 14 per cent by smelting concentrates, 14 per cent by cyanidation, and 2 per cent by amalgamation.

COPPER

The mine production of copper in Oregon in 1926 was 296,454 pounds, valued at $41,504, an increase of 179 per cent in quantity and 175 per cent in value as compared with 1925. The Homestead Iron Dyke mine was put on a producing basis by the Idaho Copper Co. in September, 1926.

Copper was produced in 1926 from mines in Baker, Douglas, Josephine, Grant, and Marion Counties, named in order of output. The chief producing copper mines were the Homestead Iron Dyke in Baker County, the Silver Peak mine in Douglas County, and a mine on Waters Creek in Josephine County. Seventy-seven per cent of the copper produced in 1926 was smelted from flotation concentrates and 23 per cent from ore; 99 per cent of the copper was from copper ores.

LEAD

In 1926 the mine production of lead in Oregon was 11,549 pounds, valued at $924, as compared with 5,612 pounds, valued at $488, in 1925. All of the lead was recovered from ore classed as siliceous gold ore and was from ore sent to smelters.

Mines in Grant County, particularly in the Granite district, produced 98 per cent of the lead output of the State, the remainder coming from Marion County.

Mine production of gold, silver, copper, and lead in Oregon, 1925 and 1926, by counties

1925

County	Ore and tailings (short tons)	Gold					
		Lode		Placer		Total	
		Fine ounces	Value	Fine ounces	Value	Fine ounces	Value
Baker	24,874	5,226.49	$108,041	3,541.54	$73,210	8,768.03	$181,251
Coos				63.57	1,314	63.57	1,314
Curry	1	6.97	144	275.75	5,700	282.72	5,844
Douglas				72.64	1,502	72.64	1,502
Grant	1,210	1,645.58	34,017	3,753.41	77,590	5,398.99	111,607
Harney	10	7.02	145			7.02	145
Jackson	779	815.54	16,859	400.83	8,286	1,216.37	25,145
Josephine	279	2,041.71	42,206	851.42	17,600	2,893.13	59,806
Lane	78	63.48	1,312			63.48	1,312
Linn	125	42.96	888			42.96	888
Malheur	127	95.67	1,978	65.69	1,358	161.36	3,336
Marion				7.49	155	7.49	155
Wheeler				5.04	104	5.04	104
	27,483	9,945.42	205,590	9,037.38	186,819	18,982.80	392,409

Mine production of gold, silver, copper, and lead in Oregon, 1925 and 1926, by counties—Continued

1925—Continued

County	Silver					
	Lode		Placer		Total	
	Fine ounces	Value	Fine ounces	Value	Fine ounces	Value
Baker	19,787	$13,732	509	$353	20,296	$14,085
Coos			7	5	7	5
Curry	2	1	46	32	48	33
Douglas			7	5	7	5
Grant	11,138	7,730	401	278	11,539	8,008
Harney	1	1			1	1
Jackson	350	243	58	40	408	283
Josephine	245	170	89	62	334	232
Lane	29	20			29	20
Linn	36	25			36	25
Malheur	74	51	10	7	84	58
Marion			3	2	3	2
Wheeler			1	1	1	1
	31,662	21,973	1,131	785	32,793	22,758

County	Copper		Lead		Total value
	Pounds	Value	Pounds	Value	
Baker	106,325	$15,098	2,079	$181	$210,615
Coos					1,319
Curry					5,877
Douglas					1,507
Grant					119,615
Harney					146
Jackson			3,533	307	25,735
Josephine					60,038
Lane					1,332
Linn					913
Malheur					3,394
Marion					157
Wheeler					105
	106,325	15,098	5,612	488	430,753

1926

County	Ore (short tons)	Gold					
		Lode		Placer		Total	
		Fine ounces	Value	Fine ounces	Value	Fine ounces	Value
Baker	12,950	2,314.75	$47,850	1,340.68	$27,714	3,655.43	$75,564
Coos				30.75	636	30.75	636
Curry				67.23	1,390	67.23	1,390
Douglas	390	52.47	1,085	106.66	2,205	159.13	3,290
Grant	717	2,495.62	51,589	3,044.88	62,943	5,540.50	114,532
Jackson	160	105.36	2,178	425.33	8,792	530.69	10,970
Josephine	290	1,920.68	39,704	826.78	17,091	2,747.46	56,795
Lane	179	81.71	1,689			81.71	1,689
Malheur	7,006	323.92	6,696	77.02	1,592	400.94	8,288
Marion	35	10.17	210	16.05	332	26.22	542
Wheeler				3.04	63	3.04	63
	21,727	7,304.68	151,001	5,938.42	122,758	13,243.10	273,759

Mine production of gold, silver, copper, and lead in Oregon, 1925 and 1926, by counties—Continued

1926—Continued

County	Silver					
	Lode		Placer		Total	
	Fine ounces	Value	Fine ounces	Value	Fine ounces	Value
Baker	8, 741	$5, 454	320	$200	9, 061	$5, 654
Coos			4	3	4	3
Curry			12	7	12	7
Douglas	2, 849	1, 778	5	3	2, 854	1, 781
Grant	15, 415	9, 619	324	202	15, 739	9, 821
Jackson	19	12	64	40	83	52
Josephine	157	98	96	60	253	158
Lane	28	17			28	17
Malheur	329	205	14	9	343	214
Marion	1, 352	844	2	1	1, 354	845
Wheeler			2	1	2	1
	28, 890	18, 027	843	526	29, 733	18, 553

County	Copper		Lead		Total value
	Pounds	Value	Pounds	Value	
Baker	234, 578	$32, 841			$114, 059
Coos					639
Curry					1, 397
Douglas	47, 080	6, 591			11, 662
Grant	2, 566	359	11, 273	$902	125, 614
Jackson					11, 022
Josephine	12, 118	1, 697			58, 650
Lane					1, 706
Malheur					8, 502
Marion	112	16	276	22	1, 425
Wheeler					64
	296, 454	41, 504	11, 549	924	334, 740

Ore and tailings sold or treated, lode mines producing, and average value of ore and tailings in Oregon, 1925 and 1926, by counties

County	Ore and tailings (short tons)		Lode mines producing		Average value per ton in all metals		Average value per ton in gold and silver	
	1925	1926	1925	1926	1925	1926	1925	1926
Baker	24, 874	12, 950	16	17	$5. 51	$6. 65	$4. 90	$4. 12
Curry	1		1		145. 00		145. 00	
Douglas		390		2		24. 24		7. 34
Grant	1, 210	717	10	6	34. 50	87. 13	34. 50	85. 37
Harney	10		1		14. 60		14. 60	
Jackson	779	160	10	10	22. 35	13. 69	21. 95	13. 69
Josephine	279	290	9	7	151. 89	143. 10	151. 89	137. 25
Lane	78	179	1	3	17. 08	9. 53	17. 08	9. 53
Linn	125		1		7. 30		7. 30	
Malheur	127	7, 006	4	3	15. 98	. 99	15. 98	. 99
Marion		35		1		31. 20		30. 11
	27, 483	21, 727	53	49	8. 85	9. 73	8. 28	7. 78

Production of placer mines in Oregon, 1925 and 1926, by counties

County	Mines				Gold	Silver (fine ounces)	Total value
	Dredge	Drift	Hydraulic	Surface			
1925							
Baker	1	3	8	7	$73, 210	509	$73, 563
Coos				6	1, 314	7	1, 319
Curry				3	5, 700	46	5, 732
Douglas			4	3	1, 502	7	1, 507
Grant	1			9	77, 590	401	77, 868
Jackson			10	7	8, 286	58	8, 326
Josephine			20	7	17, 600	89	17, 662
Malheur				3	1, 358	10	1, 365
Marion				1	155	3	157
Wheeler				1	104	1	105
	2	3	42	47	186, 819	1, 131	187, 604
1926							
Baker	1	4	5	14	27, 714	320	27, 914
Coos			1	6	636	4	639
Curry				8	1, 390	12	1, 397
Douglas			1	3	2, 205	5	2, 208
Grant	1	1	2	7	62, 943	324	63, 145
Jackson			8	6	8, 792	64	8, 832
Josephine			15	6	17, 091	96	17, 151
Malheur			3	3	1, 592	14	1, 601
Marion				3	332	2	333
Wheeler			2		63	2	64
	2	5	37	56	122, 758	843	123, 284

MINING INDUSTRY

The supply of water in Oregon in 1926 was again bad and placer mines suffered as a consequence. The two dredges, one in Baker and one in Grant County, were able to run only part time because of lack of power. Drift placer mines, which require comparatively little water, increased their production, and hydraulic output was larger though the season was short. The increase was in part due to the fact that, after the sale of a large hydraulic property in southwestern Oregon, the original owners disposed of a considerable quantity of gold that had been held as samples for several years and not previously reported as production.

The output of lode mines in 1926 scarcely reflects the actual conditions of the mining industry for, though the total value of metals produced by lode mines declined 13 per cent, copper increased 179 per cent and lead 106 per cent in quantity, as compared with 1925. It is true that the total gold production declined 30 per cent and the silver 9 per cent in quantity, but, as a matter of fact, the lode-gold mines were more active than for some years. Production revived in the Susanville-Galena district in Grant County, but the Granite district was not particularly active. In Baker County the Homestead Iron Dyke mine was put on a producing basis in September after several months spent in preparation. The Bay Horse silver mine was idle, but there was considerable activity near Durkee, Lime, Malheur, Sumpter, and Whitney. In southwestern Oregon there were several consolidations of mining properties, and development under way at a number of mines in Jackson, Josephine, and Douglas Counties should result in production in 1927. Some interest was shown in the possibility of dredging on the Rogue and Illinois Rivers.

Though little gold and platinum were produced on the beaches of Coos and Curry Counties, several rather large plants were making experimental runs.

Ore and tailings sold or treated in Oregon, 1921–1926, with content in terms of recovered metals

DRY GOLD ORE

Year	Ore and tailings	Gold	Silver	Copper	Lead
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*
1921	37,935	19,075.66	36,490		
1922	6,449	6,189.97	15,250	10,749	1,276
1923	29,472	7,506.11	25,515	3,301	857
1924	29,855	8,941.37	18,352	1,143	513
1925	24,561	9,554.34	20,369	205	4,016
1926	16,094	6,742.07	22,146	3,043	11,549

DRY SILVER ORE

Year	Ore and tailings	Gold	Silver	Copper	Lead
1921					
1922	3,956	8.76	119,146	23,587	75,694
1923	1,973	14.30	46,234	18,221	26,666
1924	156	2.20	4,778	2,543	
1925	182	16.02	9,352	520	1,596
1926	1	.29	262		

COPPER ORE

Year	Ore and tailings	Gold	Silver	Copper	Lead
1921	2,398	434.02	1,339	174,300	
1922	17,117	2,771.51	14,405	1,012,189	
1923	18,940	3,181.98	22,511	1,261,954	
1924	14,831	2,001.75	12,694	764,709	
1925	2,740	375.06	1,941	105,600	
1926	5,632	562.32	6,482	293,411	

Ore and tailings sold or treated in Oregon, 1925 and 1926, with content in terms of recovered metals

1925

Source	Mines producing	Ore and tailings		Gold		Silver	
		Short tons	Per cent	Fine ounces	Per cent	Fine ounces	Per cent
Dry gold ore and tailings	50	24,561	89.37	9,554.34	50.33	20,369	62.11
Dry silver ore	2	182	.66	16.02	.08	9,352	28.52
Copper ore	1	2,740	9.97	375.06	1.98	1,941	5.92
Total, lode mines	53	27,483	100.00	9,945.42	52.39	31,662	96.55
Total, placers	94			9,037.38	47.61	1,131	3.45
	147	27,483	100.00	18,982.80	100.00	32,793	100.00

Source	Copper		Lead	
	Pounds	Per cent	Pounds	Per cent
Dry gold ore	205	0.19	4,016	71.56
Dry silver ore	520	.49	1,596	28.44
Copper ore	105,600	99.32		
	106,325	100.00	5,612	100.00

Ore and tailings sold or treated in Oregon, 1925 and 1926, with content in terms of recovered metals—Continued

1926

Source	Mines producing	Ore		Gold		Silver	
		Short tons	Per cent	Fine ounces	Per cent	Fine ounces	Per cent
Dry gold ore	45	16,094	74.08	6,742.07	50.91	22,146	74.48
Dry silver ore	1	1		.29		262	.88
Copper ore	3	5,632	25.92	562.32	4.25	6,482	21.80
Total, lode mines	49	21,727	100.00	7,304.68	55.16	28,890	97.16
Total, placers	100			5,938.42	44.84	843	2.84
	149	21,727	100.00	13,243.10	100.00	29,733	100.00

Source	Copper		Lead	
	Pounds	Per cent	Pounds	Per cent
Dry gold ore	3,043	1.03	11,549	100.00
Dry silver ore				
Copper ore	293,411	98.97		
	296,454	100.00	11,549	100.00

Value of metals from ore and tailings treated in Oregon, 1925 and 1926

Kind of ore	Ore and tailings (short tons)	Total value		Average value per ton	
		In gold and silver	In all metals	In gold and silver	In all metals
1925					
Dry gold ore and tailings	24,561	$211,642	$212,020	$8.62	$8.63
Dry silver ore	182	6,821	7,034	37.48	38.65
Copper ore	2,740	9,100	24,095	3.32	8.79
	27,483	227,563	243,149	8.28	8.85
1926					
Dry gold ore	16,094	153,190	154,540	9.52	9.60
Dry silver ore	1	169	169	169.00	169.00
Copper ore	5,632	15,669	56,747	2.78	10.08
	21,727	169,028	211,456	7.78	9.73

Ore and tailings sold or treated in Oregon, 1925 and 1926, by counties, with content in terms of recovered metals

1925

DRY GOLD ORE

County	Ore and tailings	Gold	Silver	Copper	Lead
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*
Baker	[1] 21,964	4,851.43	9,046	205	483
Curry	1	6.97	2		
Grant	1,198	[2] 1,629.56	[2] 10,586		
Harney	10	7.02	1		
Jackson	779	815.54	350		3,533
Josephine	279	2,041.71	245		
Lane	78	63.48	29		
Linn	125	42.96	36		
Malheur	127	95.67	74		
	24,561	9,554.34	20,369	205	4,016

DRY SILVER ORE

Baker	170		8,800	520	1,596
Grant	12	16.02	552		
	182	16.02	9,352	520	1,596

COPPER ORE

Baker	2,740	375.06	1,941	105,600	
	2,740	375.06	1,941	105,600	

1926

DRY GOLD ORE

Baker	7,768	1,804.43	5,132	365	
Douglas	1	6.47			
Grant	717	2,495.62	15,415	2,566	11,273
Jackson	160	105.36	19		
Josephine	229	1,914.68	133		
Lane	179	81.71	28		
Malheur	7,005	323.63	67		
Marion	35	10.17	1,352	112	276
	16,094	6,742.07	22,146	3,043	11,549

DRY SILVER ORE

Malheur	1	.29	262		
	1	.29	262		

COPPER ORE

Baker	5,182	510.32	3,609	234,213	
Douglas	389	46.00	2,849	47,080	
Josephine	61	6.00	24	12,118	
	5,632	562.32	6,482	293,411	

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[1] Includes 200 tons tailings, yielding 42.81 ounces of gold and 26 ounces of silver.

[2] Includes 31.16 ounces of gold and 3,633 ounces of silver from mill clean-up.

METALLURGIC INDUSTRY

The total quantity of material treated at amalgamation and cyanidation plants in Oregon in 1926 was 15,565 tons, as compared with 24,335 tons in 1925. Ore amalgamated in 1926 (8,750 tons) increased 105 per cent, but ore cyanided (6,815 tons) decreased 66 per cent as compared with 1925. Both ore smelted (924 tons) and concentrates smelted (1,052 tons) in 1926 increased, the former by 127 per cent and the latter by 65 per cent, as compared with 1925.

The gold yield by amalgamation was 897.80 ounces less and by cyanidation 2,773.55 ounces less than in 1925. Gold recovered from ore by smelters increased 1,363.24 ounces, but that by smelting concentrates decreased 332.63 ounces.

Silver recovered at amalgamation mills was 4,283 ounces less than in 1925, but in 1925 3,659 ounces of silver was recovered by amalgamating old tailings, whereas no tailings were treated in Oregon during 1926. Cyanide plants recovered 1,874 ounces less silver in 1926 than in 1925, ore smelted in 1926 yielded 4,191 ounces more, and concentrates smelted 806 ounces less than in 1925.

Copper recovered from ore smelted in 1925 was practically nil (725 pounds) as compared with 68,763 pounds recovered from ore smelted in 1926, but the copper recovery by smelting flotation concentrates increased 122,091 pounds.

Lead was recovered in 1926 from smelting ores only, whereas in 1925 smelting ores yielded 37 per cent and concentrates smelted yielded 63 per cent of the lead recovered.

Metallurgic recovery of metals in Oregon, 1925 and 1926, by methods of recovery

Method of recovery	Material treated	Gold	Silver	Copper	Lead	Total value of metal
1925	*Short tons*	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	
Ore amalgamated	4,259	3,929.03	1,146			$82,016
Ore cyanided	19,876	3,866.13	5,865			83,990
Tailings amalgamated	200	73.97	3,659			4,068
Ore smelted	407	1,169.69	16,088	725	2,079	35,629
Concentrates smelted	636	906.60	4,904	105,600	3,533	37,446
		9,945.42	31,662	106,325	5,612	243,149
1926						
Ore amalgamated	8,750	3,105.20	522			64,516
Ore cyanided	6,815	1,092.58	3,991			25,076
Ore smelted	924	2,532.93	20,279	68,763	11,549	75,565
Concentrates smelted	1,052	573.97	4,098	227,691		46,299
		7,304.68	28,890	296,454	11,549	211,456

Mine production of metals from gold and silver mills in Oregon in 1926, by counties

County	Ore	Recovered in bullion				
		Amalgamation		Cyanidation		Total value
		Gold	Silver	Gold	Silver	
	Short tons	*Fine ounces*	*Fine ounces*	*Fine ounces*	*Fine ounces*	
Baker	7,544	508.68	172	1,092.58	3,991	$35,698
Douglas	1	6.47				134
Grant	461	293.43	115			6,138
Jackson	160	105.36	19			2,190
Josephine	215	1,785.92	121			36,994
Lane	179	81.71	28			1,706
Malheur	7,005	323.63	67			6,732
	15,565	3,105.20	522	1,092.58	3,991	89,592
Total, 1925	[1] 24,335	4,003.00	4,805	3,866.13	5,865	170,074

[1] Includes 200 tons of tailings amalgamated.

Mine production of metals from gold and silver mills in Oregon in 1926, by counties—Continued

County	Concentrates and recovered metal					
	Concentrates produced	Gold	Silver	Copper	Lead	Total value of metal
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	
Baker	3	20.00	10			$419
Total, 1925	3 88	20.00 525.00	10 2,961		 3,533	419 13,215

Mine production of metals from concentrating mills in Oregon in 1926, by counties

County	Ore to concentrating mills	Concentrates and recovered metal					
		Concentrates produced	Gold	Silver	Copper	Lead	Total value of metal
	Short tons	*Short tons*	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	
Baker	5,238	1,049	553.97	4,088	227,691		$45,880
Total, 1925	5,238 2,741	1,049 548	553.97 381.60	4,088 1,943	227,691 105,600		45,880 24,231

Mine production of metals from Oregon concentrates in 1926

BY COUNTIES

	Concentrates	Gold	Silver	Copper	Lead	Total value of metal
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	
Baker	1,052	573.97	4,098	227,691		$46,299
Total, 1925	1,052 636	573.97 906.60	4,098 4,904	227,691 105,600	 3,533	46,299 37,446

BY KINDS OF CONCENTRATES

Dry gold	21	64.45	587			$1,698
Copper	1,031	509.52	3,511	227,691		44,601
	1,052	573.97	4,098	227,691		46,299

AVERAGE RECOVERABLE CONTENT

	Short tons	*Fine ounces per ton*	*Fine ounces per ton*	*Per cent*	*Per cent*	*Value per ton*
Dry gold	21	3.07	27.95			$80.86
Copper	1,031	.49	3.41	11.04		43.26
Total, 1925	1,052 636	.55 1.43	3.90 7.71	10.82 8.30	 0.28	44.01 58.88

Mine production of metals from Oregon crude ore shipped to smelters in 1926

BY COUNTIES

	Ore	Gold	Silver	Copper	Lead	Total value of metal
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	
Baker	168	139.52	480	6,887	----------	$4,148
Douglas	389	46.00	2,849	47,080	----------	9,320
Grant	256	2,202.19	15,300	2,566	11,273	56,331
Josephine	75	134.76	36	12,118	----------	4,505
Malheur	1	.29	262	----------	----------	169
Marion	35	10.17	1,352	112	276	1,092
	924	2,532.93	20,279	68,763	11,549	75,565
Total, 1925	407	1,169.69	16,088	725	2,079	35,629

BY KINDS OF ORE

Dry gold	446	2,479.84	17,046	3,043	11,549	$63,250
Dry silver	1	.29	262	----------	----------	169
Copper	477	52.80	2,971	65,720	----------	12,146
	924	2,532.93	20,279	68,763	11,549	75,565

AVERAGE RECOVERABLE CONTENT

	Short tons	*Fine ounces per ton*	*Fine ounces per ton*	*Per cent*	*Per cent*	*Value per ton*
Dry gold	446	5.56	38.22	0.34	1.29	$141.82
Dry silver	1	.29	262.00	----------	----------	169.00
Copper	477	.11	6.23	6.89	----------	25.46
	924	2.74	21.95	3.72	.62	81.78
Total, 1925	407	2.87	39.53	.09	.26	87.54

REVIEW BY COUNTIES

BAKER COUNTY

Baker County ranked second in 1926 in production of the metals covered by this report; it ranked first in 1925. The county had 16 gold-lode mines and 1 copper mine producing in 1926. The gold-lode mines produced 7,768 tons of gold ore that yielded 1,804.43 ounces of gold, 5,132 ounces of silver, and 365 pounds of copper, with a total value of $40,554. From the copper mine 5,182 tons of copper ore was treated, from which were recovered 510.32 ounces of gold, 3,609 ounces of silver, and 234,213 pounds of copper; the value of the gold and silver was $12,801 and the total value was $45,591. In 1926 there were 24 producing placer mines; they yielded bullion valued at $27,914. One dredge gave 788.77 ounces of gold and 99 ounces of silver, 4 drift placers gave 245.41 ounces of gold and 50 ounces of silver, 5 hydraulic mines produced 143.20 ounces of gold and 62 ounces of silver, and 14 surface placers supplied 163.30 ounces of gold and 109 ounces of silver. The total output of the county in 1926 was 12,950 tons of ore (24,874 tons in 1925), 3,655.43 ounces of gold (8,768.03 in 1925), 9,061 ounces of silver (20,296 ounces in 1925), and 234,578 pounds of copper (106,325 pounds in 1925). No lead was produced in Baker County in 1926 (2,079 pounds in 1925). The total value for the county was $114,059 in 1926 ($210,615 in 1925).

In the Burnt River district a dredge and three surface placer mines were in operation, but water was low and the Superior dredge worked only about six months of the year. The total placer output of the district was approximately 870 ounces of gold and 190 ounces of silver. The Cornucopia mine at Cornucopia did much development work, nearly 3,600 feet, which interfered somewhat with mining; in consequence the cyanide plant was in operation only half the year. Development was carried on at the Simmons lode mine in the Cornucopia district and about 60 ounces of gold was produced at the Boulder Creek drift mine. In the Connor Creek district the Eureka drift placer was productive in a small way. In the Greenhorn district the Ibex, Rabbit, and Edwards lode mines treated 316 tons of gold ore and the Jim Frost drift placer and several small surface placers produced a total of 199 ounces of gold and 44 ounces of silver. The Homestead Iron Dyke mine at Homestead, which was under development for several months during the first part of 1926, began producing early in September, treating approximately 100 tons of ore a day in its flotation mill. The main shaft was deepened 200 feet and diamond drilling was in progress below the lower levels. Near Keating, in the Lower Powder River district, a large amount of diamond drilling and other work was done in further prospecting the copper claims on the Mother Lode and adjacent properties. In the Rye Valley district the Sunday Hill mine was the largest producer of the lode mines; in the fall the Rainbow Consolidated Gold Mining Co. acquired the holdings of the Sunday Hill Mining Co. The Rye Valley and Spring Gulch hydraulic mines and three surface placers were productive, but suffered from water shortage. The total placer recovery of this district was 45 ounces of gold and 43 ounces of silver. About 17 ounces of bullion was recovered from the Snake River near Huntington and Home. In the Sparta district the Moratte and Macy lode mines were productive and treated more than 130 tons of gold ore of good grade. Near Stice the Eva lode mine and the Yellow Metal placer were productive. In the vicinity of Sumpter the Kellogg lode mine and several small placers were productive, and a few ounces of bullion was shipped from the final clean-up of the old Sumpter dredge. The Baisley-Elkhorn continued development and it was reported that the E & E mine had changed hands. In the Weatherby district the Gleeson, Little Hill or Treasure Hill, and Steel lode mines milled 133 tons of ore, yielding 134 ounces of gold and 44 ounces of silver. The Bonanza and Snow Creek lode mines near Whitney were productive.

COOS AND CURRY COUNTIES

From the beach deposits near Powers and Bullards, Coos County, seven operators produced 30.75 ounces of gold and 4 ounces of silver. In Curry County, near Chetco, Port Orford, and Sixes, eight producers recovered 67.23 ounces of gold and 12 ounces of silver; in this total were included small lots of bullion purchased by storekeepers. Three plants for recovering gold from beach sands were erected, one near Bullards, one near Port Orford, and one near Sixes, but they did not reach the producing stage in 1926.

DOUGLAS COUNTY

The total production of Douglas County in 1926 was 159.13 ounces of gold, valued at $3,290, 2,854 ounces of silver, valued at $1,781, and 47,080 pounds of copper, valued at $6,591; the total value was $11,662.

In the Riddle district, four placer mines—three sluice and one hydraulic—produced 106.66 ounces of gold and 5 ounces of silver. The largest placer output was from the Bradfield hydraulic mine. The Diamond Butte mine on Cow Creek, near Glendale, and the Silver Peak group of mines near Riddle were the important producing lode mines in Douglas County in 1926; of these the Silver Peak was by far the larger operation, shipping several hundred tons of copper sulphide ore. This mine is worked by the Silver Peak Mining & Milling Co. Several hundred feet of development work was done on lodes carrying copper, silver, and gold at the Beaver Springs property in the Riddle district.

GRANT COUNTY

Grant County was first in importance in 1926 in production of metals covered by this report. The total value of gold, silver, copper, and lead produced by 6 lode mines and 11 placer mines in Grant County in 1926 was $125,614. The county yield was as follows: Gold, 5,540.50 ounces, valued at $114,532; silver, 15,739 ounces, valued at $9,821; copper, 2,566 pounds, valued at $359; and lead, 11,273 pounds, valued at $902.

The output of placer gold was 3,044.88 ounces, valued at $62,943, most of which was saved by the Empire dredge at John Day. One drift mine, two hydraulic mines, and seven sluice operations saved a total of 244.65 ounces of gold and 45 ounces of silver. Placer mines were operated near Canyon City, Granite, Prairie City, Quartzburg, and Susanville. The largest single placer operation, aside from the Empire dredge, was the Sunshine sluice mine, operated by Dr. L. P. Wallitner of Canyon City.

Six lode mines produced a total of 717 tons of dry gold ore, yielding 2,495.62 ounces of gold, 15,415 ounces of silver, 2,566 pounds of copper, and 11,273 pounds of lead—a value for gold and silver of $61,208 and a total value of $62,469.

The largest producers in Grant County were the Buffalo-Monitor, operated by Nichols, Hallock & Donald of Baker, and the Pittsburg, operated by the Miller Mountain Mining Co. of Canyon City. The mines near Susanville and Galena were again active and producing in 1926 after a shutdown of two years. Development was continued in the tunnel at the property of the Oregon Mining & Milling Co. of Canyon City. In the Granite district the Ben Harrison was reopened late in the year by the C. L. Morris Construction Co. of Seattle, and the Magnolia was further developed. The properties of the Equity Copper & Gold Mining Co. in the Quartzburg district were worked by J. H. Dunston under lease, but no ore was shipped. The Ophir group of lode claims, owned by the Utah Oregon Gold Mines Co. of Prairie City, was under development and $30 ore was reported found.

JACKSON COUNTY

In 1926 there were 10 producing lode mines and 14 producing placers, from which gold and silver to the value of $11,022 were saved.

Eight hydraulic mines near Applegate, Foots Creek, Gold Hill, and Jacksonville produced 356.52 ounces of gold and 51 ounces of silver, and six sluice operations near Applegate and Jacksonville yielded 68.81 ounces of gold and 13 ounces of silver. The largest operations were at the Pacific (Layton), Williams, and Sterling hydraulic mines near Applegate and at the Black Channel hydraulic on Foots Creek.

Ten gold lode mines in 1926 produced 160 tons of ore, which yielded 105.36 ounces of gold and 19 ounces of silver. The chief producers were the Great I Am, Producer, and Shattuck lodes in the Applegate district and the Highway and Foots Creek lodes in the Foots Creek district.

Mines in the Applegate district under development in 1926 included the Afterthought, None Such, and Blue Rock lode claims. Near Gold Hill several hundred feet of development work was done on the Golden Cross. At the Gold Canyon mine in the Jacksonville district a 275-foot crosscut was driven. In the Foots Creek district the North Pole group was developed and the mine was electrically equipped.

JOSEPHINE COUNTY

Josephine County in 1926 ranked third as a producer of the metals covered by this report.

In 1926 seven lode mines and 21 placer mines yielded 2,747.46 ounces of gold, 253 ounces of silver, and 12,118 pounds of copper, having a combined value of $58,650.

Fifteen hydraulic mines produced 727.79 ounces of gold and 83 ounces of silver, which had a total value of $15,097. The chief producing hydraulic mines were the Dean and Dean mine in the Galice district, the Swastika mine in the Jumpoff Joe district, the Anderson mine at Kerby, the Osgood and Deep Gravel mines at Waldo, and the Ruble mine at Wolf Creek. Sluice operations near Althouse and Galice yielded 22.14 ounces of gold and 3 ounces of silver, and sluicing operations of unknown location in the county yielded 76.85 ounces of gold and 10 ounces of silver. It is reported that strong interests have examined the Illinois and Rogue River Valleys to ascertain the feasibility of dredging for gold.

Six gold lode mines—2 at Galice, 3 near Grants Pass, and 1 on Wolf Creek—produced 229 tons of ore which yielded 1,914.68 ounces of gold and 133 ounces of silver, having a total value of $39,663. One shipment of copper ore was made from a mine on Waters Creek. The largest producers in the county were the Progressive mine at Galice and the Golden Mary mine near Grants Pass.

Near Galice the Western Metal Mines Co. did 300 feet of work, and at the Mount Ruben mine the main tunnel was driven 1,216 feet farther. The Llano De Oro hydraulic mine at Waldo was under intensive development and the long drain tunnel at this property is said to have been completed in 1926. A short water season cut hydraulic mining considerably, and the heavy rains of the winter of 1926–27 damaged several flumes and ditches. The Hell Gate Bridge on Rogue River was carried out, and work in the Galice district was consequently delayed.

LANE COUNTY

Three lode mines in the Bohemia district in 1926 produced 179 tons of gold ore, which yielded 81.71 ounces of gold and 28 ounces of silver, having a combined value of $1,706. The largest producer was the Musick mine operated by L. M. Capps & Co. The Evening Star mine is reported to have been included in a new combination to be known as the Bartels Mining Co., which will also embrace the Annex, Bohemia, and Champion mines.

LINN COUNTY

Some development was done on the Mayflower, Snow Flake, and Harold silver-lead lode mines in the Quartzville district, reached by trail from Gates. There was no production from these mines in 1926, as mining operations were waiting the completion of a truck road from Lebanon on the railroad through Foster and up the South Santiam River.

MALHEUR COUNTY

Three lode mines and six placer mines were productive in Malheur County in 1926; they made a total output of 400.94 ounces of gold and 343 ounces of silver, valued together at $8,502.

Three hydraulic mines, of which the most important was the Basin Creek mine in the Malheur district, produced 58.07 ounces of gold and 10 ounces of silver, having a combined value of $1,206. Three surface placers on the Snake River near Ontario produced 18.95 ounces of gold and 4 ounces of silver, valued in all at $395.

Three lode mines, of which the most important were the Rainbow and the Red, White and Blue in the Malheur district, produced 7,006 tons of ore, which yielded 323.92 ounces of gold and 329 ounces of silver, having a combined value of $6,901. One shipment of silver ore was made from a property at Jordan Valley. The Rainbow Consolidated Gold Mining Co. acquired the Sunday Hill mine in Baker County in 1926, and the Rainbow and Sunday Hill mines will be worked as one in the future.

MARION COUNTY

One lode mine and three placer mines in Marion County in 1926 produced 26.22 ounces of gold, 1,354 ounces of silver, 112 pounds of copper, and 276 pounds of lead, having a total value of $1,425. The placer mines were small sluice affairs on the Santiam River; they yielded 16.05 ounces of gold and 2 ounces of silver, having a combined value of $333. The only productive lode mine was worked by J. G. Thane, of Corvallis, who shipped one car of ore from Tulsa. Development continued at the Silver King mine in the Elkhorn district.

UNION COUNTY

No mines were productive in Union County, but development continued at the Twin Baby property near Medical Springs.

WHEELER COUNTY

Two hydraulic mines near Antone in 1926 produced 3.04 ounces of gold and 2 ounces of silver, having a total value of $64. No lode mines in the county reported production.

LEAD[1]

By AMY STOLL[2]

INTRODUCTION

By J. A. STADER

The United States has long been the leader among the world's principal lead-producing countries, followed by Mexico, Australia, Spain, and Canada.

Discoveries through prospecting for new lead ore bodies or exploring areas already being mined were few in number and of little importance in the United States during 1926. The country's increase in output was due largely to improved methods of ore dressing and especially to the use of selective flotation, a method that not only makes feasible a far greater recovery of concentrates from lead ores but permits recovery from complex ores which previously were considered too lean in lead for utilization. With more extensive use of the electrolytic method for reducing leady zinc concentrates, an important recovery of lead was made from the residues of the leaching tanks which heretofore—while pyrometallurgical methods only were available—would have been lost in part by being discarded with the residues from the retorts.

That the United States has no large undiscovered lead deposits to supplement those being slowly exhausted may be true; however, with improved ore dressing and metallurgy and with the supplementary output of secondary or reclaimed metal, old fields now being exploited should supply the requirements of lead for many years. In the meantime, it is hoped, industrial research will show how to meet requirements without danger of overdraft on the supply of lead.

Mexican lead production, two-thirds of which came from the border States, was largely stimulated by the activity of industry in the United States and was favored by freedom from serious labor or political disturbances.

Australian production in 1926, principally from ore bodies which have been exploited for many years, surpassed that of 1925, largely as a result of the introduction of advanced concentrating methods, helped in the latter part of the year by favorable rainfall which supplied an abundance of water for maximum operations. Development in the Mount Isa district is yet mainly in the prospecting stage and has been greatly handicapped by the absence of a railroad to the east coast, which, however, is now under construction. One interesting development of the year was the acquisition of an option on the property of the Mount Isa (Ltd.), an Australian company, by the Anglo-American Corporation of South Africa (Ltd.). The extension of the holdings of this corporation to Australia and the entrance of the Anaconda Co. into Upper Silesia illustrate the tendency of large mining companies to broaden the scope of their operations.

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[1] Chapters on lead giving more than ordinary detail were published in Mineral Resources for 1908 (historical table of production) and 1918 (the lead industry in relation to the World War).

[2] Figures on imports and exports compiled by J. A. Dorsey, of the Bureau of Mines, from records of the Bureau of Foreign and Domestic Commerce.

Canadian lead resources have been developed very rapidly in the last few years. British Columbia produces most of the lead; the remainder of the Dominion output comes from Ontario, from the Mayo district of Yukon Territory, and from Quebec. The product from British Columbia was largely exported to the Orient and Europe, and that produced in Ontario supplied most of the Canadian demand for lead. The Sudbury district, which has been noted as nature's great nickel storehouse, gives promise of also being a lead producer.

The lead output of India is almost entirely that of the Bawdwin mine of the Burma Corporation (Ltd.), in the Upper Shan States. The increase in production over 1925 indicates a rapid recovery from the disastrous fire which necessitated closing parts of the workings by bulkheads and thereby curtailing the 1925 production. The lead deposits in the Southern Shan States, which formerly were worked extensively by the Chinese, have been inactive for many years.

Spain is the outstanding lead-producing country of Europe. The Spanish deposits have been exploited since ancient times and for the past three years have steadily increased their output of ore. Mines in the Province of Jaen account for about half of the total Spanish production. Next in importance are those in Cordoba, and third, those in Murcia. La Sociedad Minera y Metalurgica de Peñarroya, the principal producer, has a lead, zinc, and silver smelter in Cordoba. The Sociedad Minera Metalurgica Los Guindos is also a large producer of lead. Only a small part of the lead produced in Spain is consumed in the country, the larger part being exported to England or Germany as pigs, bars, or ore.

Africa, which has made important contributions to the world's lead supply from Morocco and promises a considerable output from Rhodesia, may also make important contributions from the Southwest Africa mandate, if the newly discovered Aiais field comes up to expectations. This district lies between the Great Fish and Kameldoorn Rivers and is a more or less arid and unexplored country, but an ample supply of both water and power can be obtained from the Great Fish River.

The per capita consumption of lead in other countries is small in comparison to that of the United States. Storage-battery requirements in foreign countries, especially for automobiles, are not nearly so great as in the United States. Other countries have been slower in adopting and developing the telephone and other electrical devices as necessities of business or social life, therefore the demand for lead for cable sheathing has not yet reached the height it probably will. Construction in Europe is of a permanent character and uses comparatively little material requiring the protection of lead or zinc pigments; on the other hand, the vast timber resources of the United States have encouraged frame construction, for which the protection of paint was necessary. As our forests are depleted and wooden structures replaced with others of more nearly permanent material the building industry will require less lead.

Many industries that consume lead are learning through their research laboratories to use it to a greater advantage and more economically. Probably the cable industry has been a leader in this respect, as indicated by comparing the thick, heavy, lead cable sheathing of 20 years ago with the thinner and lighter lead-tin-antimony alloy sheathing of to-day that has higher tensile strength and other advantageous physical properties. Storage-battery manufacturers likewise have developed a grid which is lighter but offers greater resistance to buckling. For some uses other material has partly supplanted lead, particularly in plumbing supplies and in pigments.

SUMMARY

Refined primary lead produced in the United States from domestic ores in 1926 amounted to 680,685 short tons, valued at $108,910,000, at the average selling price of pig lead. These figures represent an increase of 4 per cent in quantity but a decrease of 4 per cent in value as compared with 1925. Refined lead produced from foreign ores and base bullion amounted to 118,256 tons, valued at $18,921,000. The total output of lead from both domestic and foreign ores and bullion was 798,941 tons, valued at $127,831,000.

Refined lead produced and consumed in the United States, 1925–26, in short tons

	1925	1926
PRODUCTION		
Domestic desilverized lead	345, 429	366, 413
Domestic soft lead	260, 560	258, 565
Domestic desilverized soft lead	48, 932	55, 707
	654, 921	680, 685
Foreign desilverized lead	112, 048	118, 256
Total refined primary lead [1]	766, 969	798, 941
Antimonial lead	19, 667	22, 524
Secondary lead [1]	226, 880	277, 300
CONSUMPTION [2]		
Apparent consumption of primary lead, refinery stocks disregarded	655, 655	717, 653

[1] "Primary lead," which is produced directly from ore, is here distinguished from "secondary lead," which is obtained by refining skimmings, drosses, and old metals. The statistics of secondary lead are given on p. 361. In this report the word "lead" used without qualification means primary lead.

[2] For method of calculating consumption, see p. 368.

Refined lead produced in the United States from domestic ores, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	548, 450	$94, 333, 000	1922	468, 746	$51, 562, 000
1918	539, 905	76, 667, 000	1923	543, 841	76, 138, 000
1919	424, 433	44, 990, 000	1924	566, 407	90, 625, 000
1920	476, 849	76, 296, 000	1925	654, 921	113, 956, 000
1921	398, 222	35, 840, 000	1926	680, 685	108, 910, 000

PRODUCTION

QUANTITY AND VALUE

The total refined lead produced in the United States from 1720 to 1926, from domestic ores and from foreign ores and base bullion, and its value are shown in the following table:

Refined lead produced in the United States, 1720–1926

Year	Short tons							Value	
	Desilverized lead [1, 2]	Desilverized soft lead	Soft lead [2]	Total production [1]	From domestic ores and base bullion	From foreign ores	From foreign base bullion	Average per pound	Total
1720–1912	7,176,497	326,991	2,929,180	10,432,668	8,545,383	1,887,285		--------	$924,600,000
1913	301,160	29,433	131,867	462,460	411,878	13,223	37,359	$0.044	40,696,000
1914	340,397	43,506	158,219	542,122	512,794	7,639	21,689	.039	42,286,000
1915	344,593	44,001	161,461	550,055	507,026	9,581	33,448	.047	51,705,000
1916	335,375	68,244	167,515	571,134	552,228	6,085	12,821	.069	78,817,000
1917	365,998	56,268	188,503	610,769	548,450	15,872	46,447	.086	105,052,000
1918	382,314	47,418	210,463	640,195	539,905	15,334	84,956	.071	90,908,000
1919	266,538	67,938	147,744	482,220	424,433	7,656	50,131	.053	51,115,000
1920	273,135	66,668	189,854	529,657	476,849	8,414	44,394	.080	84,745,000
1921	238,329	52,747	157,513	448,589	398,222	7,120	43,247	.045	40,373,000
1922	249,107	74,305	209,250	532,662	468,746	13,898	50,018	.055	58,593,000
1923	366,241	61,332	190,749	618,322	543,841	24,288	50,193	.070	86,565,000
1924	423,429	63,449	203,615	690,493	566,407	46,385	77,701	.080	110,479,000
1925	457,477	48,932	260,560	766,969	654,921	47,024	65,024	.087	133,453,000
1926	484,669	55,707	258,565	798,941	680,685	48,210	70,046	.080	127,831,000
	12,005,259	1,106,939	5,565,058	18,677,256	15,831,768	2,845,488		--------	2,027,218,000

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[1] The lead content of antimonial lead is excluded; see p. 360.
[2] Desilverized soft lead is excluded.

Details for years prior to 1913 are shown in the annual chapters. The value for years prior to 1917 is based upon the average price in New York; beginning with 1917 the value is based on the total sales of each producing company.

PRODUCTION BY STATES

To apportion the production of refined lead according to sources of ore is difficult; lead refiners treat products already smelted, whose origin may, as in custom refining, be unknown to them, because the identity of the ore is preserved only as far as the smelter. Accordingly, the following table is compiled, so far as possible, from smelter figures. It includes "pig lead" reported by all smelters running on Mississippi Valley or other "soft" lead ores and "work lead" produced at all other lead smelters, except that the greater part of the product reported by silver-lead smelters operated in conjunction with refineries is stated in terms of refined lead. A like part of the antimonial lead is thus eliminated from the "work lead" produced and appears only in the figures of production of antimonial lead.

In addition to the domestic lead ores smelted in this country, small quantities of domestic lead ore have been exported to smelters in Canada. During the period 1912 to 1919, 8,228 tons of desilverized lead was produced at Canadian smelters from Idaho, Washington, and Montana ores and 100 tons of soft lead from Wisconsin ores. No lead ore from the United States was treated in Canada from 1920 to 1926.

Primary lead smelted or refined in the United States, 1917–1926, by sources, in short tons

Source of ore	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
Domestic ore:										
Alaska	884	531	645	591	773	324	400	582	699	1, 018
Arizona	7, 456	6, 195	5, 407	5, 987	3, 313	7, 218	8, 828	9, 372	10, 281	10, 646
Arkansas [1]	300	14	--------	--------	--------	--------	--------	--------	--------	--------
California	11, 471	6, 228	2.004	2, 260	614	3, 018	5, 168	2, 305	4, 148	4, 044
Colorado	29, 327	29, 395	18, 867	17, 752	12, 104	11, 108	23, 885	25, 491	31, 855	37, 553
Idaho	174, 045	142, 640	89, 091	117, 191	99, 707	91, 487	127, 797	123, 709	123, 363	132, 564
Illinois [1]	867	1, 010	977	948	271	750	1, 286	1, 089	474	357
Kansas [1]	2, 663	5, 023	7, 951	8, 421	10, 939	10, 900	20, 207	12, 895	15, 001	20, 884
Kentucky [1]	21	109	83	114	41	73	66	201	96	27
Missouri [1]	218, 197	187, 743	150, 341	171, 999	151, 028	202, 245	169, 323	191, 501	208, 547	218, 083
Montana	5, 933	17, 586	17, 513	13, 231	11, 565	14, 551	18, 345	21, 226	22, 008	26, 350
Nevada	12, 334	8, 726	5, 958	8, 650	3, 553	4, 264	8, 044	8, 070	10, 978	11, 379
New Hampshire	--------	--------	16	--------	--------	--------	--------	--------	--------	--------
New Mexico	3, 428	5, 140	1, 418	1, 123	384	1, 230	1, 638	2, 263	3, 782	4, 383
New York	--------	49	--------	--------	--------	--------	--------	--------	--------	--------
Oklahoma [1]	19, 646	58, 755	49, 984	68, 494	46, 902	67, 436	59, 602	56, 017	78, 487	70, 004
Oregon	--------	6	--------	--------	--------	37	47	--------	6	5
South Dakota	34	28	18	6	2	2	--------	2	2	1
Tennessee [1]	--------	843	2, 371	2, 705	--------	751	1, 020	985	436	770
Texas	58	30	8	1	1	5	40	27	31	102
Utah	82, 081	76, 169	65, 102	64, 006	51, 872	63, 130	104, 678	119, 318	166, 844	151, 127
Virginia [1]	147	59	--------	--------	--------	--------	--------	1, 582	2, 179	1, 714
Washington	929	906	1, 090	2, 460	325	478	2, 008	2, 057	2, 802	2, 262
Wisconsin [1]	2, 930	4, 275	3, 975	3, 841	1, 079	1, 323	601	1, 973	2, 889	2, 052
Undistributed	145	59	119	201	101	75	691	15	2	--------
Zinc residues	6, 489	5, 359	4, 887	4, 366	713	1, 284	362	1, 320	1, 541	505
	579, 385	556, 878	427, 825	494, 347	395, 287	481, 689	554, 036	582, 000	686, 451	695, 830
Foreign ore:										
Africa	1, 738	1, 519	644	1, 171	--------	--------	99	6	--------	6
Australia	--------	282	69	450	--------	--------	--------	--------	--------	--------
Canada	1, 100	7, 550	1, 895	1, 186	2, 877	3, 604	3, 632	4, 633	10, 676	5, 385
Central America	--------	--------	12	22	6	14	18	30	6	--------
Europe	3, 552	84	122	19	17	519	139	328	470	233
Mexico	7, 607	4, 798	2, 261	2, 729	1, 912	7, 260	18, 867	33, 328	31, 107	32, 693
South America	1, 533	1, 101	2, 537	2, 747	2, 235	2, 458	1, 461	7, 663	4, 496	9, 893
Other foreign	342	--------	116	90	73	43	72	397	269	--------
Foreign base bullion:										
Canada	6, 750	8, 108	567	1, 919	1, 599	2, 900	--------	--------	--------	--------
Mexico	39, 508	76, 809	49, 564	42, 421	41, 648	47, 118	50, 193	77, 701	65, 024	70, 046
South America	189	39	--------	54	--------	--------	--------	--------	--------	--------
	62, 319	100, 290	57, 787	52, 808	50, 367	63, 916	74, 481	124, 086	112, 048	118, 256
Grand total	641, 704	657, 168	485, 612	547, 155	445, 654	545, 605	628, 517	706, 086	798, 499	814, 086

[1] The lead produced by these States is nonargentiferous or soft lead. A small quantity of the lead produced from Colorado and New Mexico ores is also nonargentiferous.

SOFT LEAD

The lead ores of the Mississippi Valley are almost free from silver, and the lead produced from them is known as soft lead. The output of the lead pigment known as basic lead sulphate or sublimed lead is derived from these ores. The galena of southern Illinois, however, is notably argentiferous as compared with the rest of the Mississippi Valley ores, and the silver-bearing lead concentrates treated during the period 1917 to 1926 averaged 5.5 ounces of silver to the ton. Lead in this district is now produced only incidentally in the concentration of fluorspar, and the output is small compared with that from other districts in the Central States. Lead ores from southeastern Missouri also contain a small amount of silver; over a series of years the silver-bearing lead concentrates smelted have averaged about 1 ounce of silver to the ton.

Zinc ores from Western States, that are made into zinc oxide, contain some lead which goes into the pigment; therefore it is not strictly accurate to speak of the lead content of pigments as wholly soft lead.

In some years small quantities of foreign lead have also been made into pigments in the United States. During the period covered by the following table lead pigments were made from foreign ores in 1924 only, when the lead so recovered amounted to 545 tons.

Soft lead produced in the United States from domestic ores, 1922–1926, in short tons

Year	Soft pig lead			Soft lead recovered in pigments	Total soft lead	Total domestic lead [1]	Soft lead percentage of domestic lead
	Undesilverized	Desilverized	Total				
1922	209,250	74,305	283,555	13,892	297,447	488,448	61
1923	190,749	61,332	252,081	13,612	265,693	567,247	47
1924	203,615	63,449	267,064	15,338	282,402	593,486	48
1925	260,560	48,932	309,492	17,547	327,039	684,968	48
1926	258,565	55,707	314,272	13,685	327,957	710,990	46

[1] Includes domestic refined lead, domestic lead in antimonial lead, and domestic lead in pigments.

ANTIMONIAL LEAD

By-product antimonial lead, produced at lead refineries in 1926 from domestic and foreign argentiferous lead ores, amounted to 22,524 short tons. This amount is 15 per cent greater than the production in 1925 and has been exceeded only by the output in 1915 and 1916. Considerable antimonial lead from secondary sources was also produced at regular lead smelters in 1926; the figures covering such production are given in the chapter on secondary metals.

By-product antimonial lead produced in the United States, 1917–1926

Year	Total lead refined from base bullion (short tons)	By-product antimonial lead (percentage of total)	Antimonial lead						
			From domestic ore (short tons)	From foreign ore (short tons)	Total				
					Short tons	Value	Antimony content		Lead content, by difference (short tons)
							Short tons	Percentage	
1917	365,998	5.1	15,279	3,367	18,646	$3,781,560	2,759	14.8	15,887
1918	382,314	4.9	10,777	7,793	18,570	2,826,350	2,566	13.8	16,004
1919	266,538	5.2	9,674	4,200	13,874	1,513,968	1,943	14.0	11,931
1920	273,135	4.6	9,604	2,931	12,535	1,963,255	2,033	16.2	10,502
1921	238,329	4.2	7,881	2,183	10,064	870,059	1,589	15.8	8,475
1922	249,107	3.2	7,068	1,007	8,075	844,993	1,441	17.8	6,634
1923	366,241	3.9	11,635	2,555	14,190	1,950,370	2,170	15.3	12,020
1924	423,429	4.9	13,593	7,194	20,787	3,376,713	2,763	13.3	18,024
1925	457,477	4.3	14,472	5,195	19,667	3,785,547	2,624	13.3	17,043
1926	484,669	4.6	18,909	3,615	22,524	3,916,714	2,693	12.0	19,831
Average	----------	4.5	----------	----------	----------	----------	----------	14.2	----------

LEAD PIGMENTS

The amount of lead contained in pigments was equivalent to 37 per cent of the total domestic lead recovered in 1926 and to 40 per cent in 1925. By far the largest part was contained in the pigments manufactured from pig lead—white lead, red lead, orange mineral, and litharge. In these pigments the lead content ranges from about 80 per cent to nearly 93 per cent. A smaller quantity of lead was recovered in the pigment known as basic lead sulphate, or sublimed white lead and sublimed blue lead, and a still smaller amount was recovered from the zinc ores from which the zinc oxides were produced. Further details regarding the manufacture and sale of these pigments are given in the Mineral Resources chapter on "Lead and zinc pigments and salts."

Lead in pigments,[1] 1922–1926, by sources, in short tons

Year	Lead in pigments from—			
	Domestic ore	Foreign ore	Primary metal	Secondary metal
1922	13,892		241,096	111
1923	13,612		236,541	
1924	15,338	545	250,930	
1925	17,547		256,064	
1926	13,685		240,902	1,029

[1] Includes also lead recovered in zinc oxide and leaded zinc oxide.

SECONDARY LEAD

The recovery of lead from waste products is a branch of the metal industry that has expanded notably in recent years. The main sources of secondary pig lead are old pipe, lead cable, battery plates, lead lining of acid tanks, and the alloys—babbitt, solder, and type metal. The most important of these sources is old battery plates, the manufacture of which has increased greatly with the growth of the automobile and radio industries.

The recovery of secondary pig lead at regular smelters and at those that treat only old material amounted to 125,000 short tons in 1926, an increase of 11 per cent over 1925.

Secondary lead recovered in the United States, 1922–1926, in short tons

Year	Pig lead	Lead in alloys	Total recovered lead	Value
1922	75,480	84,080	159,560	$17,552,000
1923	96,430	98,060	194,490	27,229,000
1924	90,400	114,100	204,500	32,720,000
1925	112,420	114,460	226,880	39,477,000
1926	125,000	152,300	277,300	44,368,000

MINE PRODUCTION

The recoverable lead in ore mined in the United States in the 10-year period 1917 to 1926 is shown in the following table. These figures represent the lead content of all ore mined, less a deduction made for assumed loss in smelting and refining. This loss has been taken as 2 per cent in smelting the soft lead ores of the Mississippi Valley, and about 5 per cent in smelting and refining the argentiferous lead ores of the Western States.

The mine production of recoverable lead in 1926 was the largest ever reported, with the exception of that in 1925. Missouri easily retained first place as a producer, and Utah again ranked second. In both of these States, however, the production was slightly below that of 1925. Idaho ranked third in 1926 and showed a gain of 8 per cent over 1925. More than one-third of the country's mine production of recoverable lead during the 10-year period 1917 to 1926 was from Missouri.

Mine production of recoverable lead, 1917–1926, by States, in short tons

State	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
Alaska	852	564	687	875	759	377	410	631	789	778
Arizona	11, 146	5, 939	4, 847	6, 935	3, 271	7, 535	8, 146	9, 321	11, 938	11, 629
Arkansas	374	118	27	8	21	42	25	20	58	18
California	10, 387	6, 351	1, 695	2, 407	562	3, 156	4, 775	2, 382	3, 283	4, 047
Colorado	33, 995	32, 980	18, 535	23, 315	9, 830	11, 739	22, 849	23, 779	31, 483	34, 494
Georgia				2		4				
Idaho	186, 941	139, 981	86, 612	118, 565	99, 235	97, 917	121, 178	124, 475	126, 521	136, 490
Illinois	1, 410	2, 228	2, 063	1, 708	672	1, 325	1, 381	1, 464	1, 001	655
Iowa	33									
Kansas	2, 965	7, 107	11, 057	16, 452	18, 679	23, 271	17, 598	18, 560	22, 775	28, 463
Kentucky	121	181	84	120	69	92	53	175	152	58
Maine			1							
Massachusetts				14				(1)		
Missouri	229, 473	190, 292	160, 024	161, 812	180, 085	178, 412	169, 743	189, 929	211, 566	207, 012
Montana	10, 427	17, 640	16, 358	14, 846	10, 183	14, 884	17, 973	19, 738	18, 765	21, 153
Nevada	13, 147	11, 075	7, 291	10, 100	3, 594	4, 695	9, 078	10, 030	12, 238	11, 184
New Hampshire	48	30								
New Mexico	4, 554	4, 199	1, 443	1, 435	339	1, 506	1, 916	1, 817	3, 210	3, 480
New York		29								
North Carolina	1									
Oklahoma	25, 831	54, 975	52, 795	64, 086	41, 552	62, 856	66, 904	71, 358	79, 946	69, 704
Oregon		4				38	14	(2)	3	6
Pennsylvania				7						
South Dakota	34	27	16	6	2					
Tennessee	2, 404	1, 620	2, 079	1, 880		732	1, 250	937	448	800
Texas	1	13	7			4	13		8	42
Utah	84, 798	79, 329	58, 819	66, 898	44, 594	67, 666	101, 724	116, 955	153, 335	147, 635
Virginia	816	774						1, 275	2, 229	2, 450
Washington	4, 650	2, 504	1, 019	2, 749	72	691	1, 453	1, 968	2, 814	2, 273
Wisconsin	4, 056	4, 442	4, 130	2, 594	972	691	734	1, 254	1, 877	1, 546
	628, 464	562, 402	429, 589	496, 814	414, 491	477, 633	547, 217	596, 068	684, 439	683, 917

[1] It is said that a few tons of lead ore was mined at the old Chipman mine in Massachusetts and was treated at a small smelter owned by the mine operators.

[2] 513 pounds.

LEAD SMELTERS AND REFINERIES

UNITED STATES

California: Selby—Selby plant, American Smelting & Refining Co. (Smelter and refinery.)

Colorado:
- Durango—Durango plant, American Smelting & Refining Co. (Smelter.)
- Leadville—Arkansas Valley plant, American Smelting & Refining Co. (Smelter.)

Idaho: Kellogg—Bunker Hill & Sullivan smelter. (Smelter and refinery.)

Illinois:
  Chicago—Great Western Smelting & Refining Co.[3] (Smelter.)
  Collinsville—St. Louis Smelting & Refining Works of National Lead Co. (Smelter and refinery.)
  Federal—Federal plant, American Smelting & Refining Co. (Smelter.)
Indiana:
  East Chicago—International Lead Refining Co.[4] (Refinery only.)
  Grasselli—U. S. S. Lead Refinery (Inc.).[5] (Refinery only. Betts electrolytic process.)
Kansas: Galena—Galena plant, Eagle-Picher Lead Co. (Smelter.)
Missouri:
  Granby—American Zinc, Lead & Smelting Co.[6] (Smelter.)
  Herculaneum—St. Joseph Lead Co. (Smelter and refinery.)
  Joplin—Eagle-Picher Lead Co. (Smelter.)
Montana: East Helena—East Helena plant, American Smelting & Refining Co. (Smelter.)
Nebraska: Omaha—Omaha plant, American Smelting & Refining Co. (Refinery only. Betts electrolytic process.)
New Jersey:
  Newark—Balbach plant, American Metal Co. (Ltd.). (Smelter and refinery.)
  Perth Amboy—Perth Amboy plant, American Smelting & Refining Co. (Smelter and refinery.)
Oklahoma: St. Louis—Ontario smelter, Eagle-Picher Lead Co. (Smelter.)
Pennsylvania: Carnegie—Pennsylvania Smelting Co. (Smelter and refinery.)
Texas: El Paso—Kansas City Consolidated Smelting & Refining Co.[7] (Smelter.)
Utah:
  International—International Smelting Co.[8] (Smelter.)
  Midvale—United States Smelting, Refining & Mining Co. (Smelter.)
  Murray—Murray plant, American Smelting & Refining Co. (Smelter.)

CANADA

British Columbia: Trail—Consolidated Mining & Smelting Co. of Canada (Ltd.). (Smelter and refinery. Betts electrolytic process.)
Ontario: Galetta—Estate of James Robertson. (Smelter.)

MEXICO

Chihuahua: Chihuahua—American Smelting & Refining Co. (Smelter.)
Coahuila:
  Saltillo—Mazapil Copper Co. (Ltd.). (Smelter.)
  Torreón—American Metal Co. (Ltd.). (Cia. Metalúrgica de Torreón.) (Smelter.)
Durango: Asarco (Velardeña)—American Smelting & Refining Co. (Cia. Minera Asarco.)[9] (Smelter.)
Guerrero: Campo Morado—Reforma Mining & Milling Co. (Smelter.)
Nuevo Leon:
  Monterrey—American Metal Co. (Ltd.). (Cia. Minera de Peñoles—S. A.) (Smelter and refinery.)
  Monterrey—American Smelting & Refining Co. (Smelter.)
San Luis Potosi:
  Matehuala—American Smelting & Refining Co. (Cia. Minera Asarco.) (Smelter.)
  San Luis Potosi—American Smelting & Refining Co. (Cia. Minera Asarco.) (Smelter.)
Zacatecas: La Fé—American Metal Co. (Ltd.). (Cia. Minera de Peñoles—S. A.) (Smelter.)

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[3] Smelters of secondary materials but treating some lead ores.
[4] Subsidiary of Anaconda Copper Mining Co.
[5] Subsidiary of the United States Smelting, Refining & Mining Co.
[6] Plant idle in 1926.
[7] Subsidiary of American Smelting & Refining Co.
[8] Subsidiary of Anaconda Copper Mining Co
[9] Plant closed in 1926 and being dismantled.

WORLD'S PRODUCTION

The accompanying table, prepared by L. M. Jones, of the Bureau of Mines, shows the world's smelter production of lead from 1922 to 1926, so far as statistics are available. Official figures are used wherever possible. For countries for which official data are not yet available, the figures are taken from the yearbook of the American Bureau of Metal Statistics and other reliable sources, but the official statistics will be substituted as received.

There is always a possibility of duplication in figures showing world's production, for some countries send "work lead" or base bullion to other countries for refining. Furthermore, secondary and antimonial lead are often included in the figures showing the foreign production, so that to put the United States on an equal footing in the statistics it would be necessary to include in its production the domestic output of secondary lead and antimonial lead. The figures for the United States represent refined lead that was smelted in this country, whatever the source of the ore.

World's production of lead, 1922–1926

[In metric tons, by countries where smelted, but not necessarily refined]

Country [1]	1922	1923	1924	1925	1926
Australia	105,126	132,165	128,657	148,474	152,875
Austria	3,360	4,255	4,985	5,408	6,478
Belgium	43,574	51,100	58,320	65,570	61,762
Canada	40,191	46,801	75,503	104,303	116,697
Chosen	(2)	(2)	(2)	485	1,958
Czechoslovakia	2,228	2,452	2,264	2,050	2,235
France	13,944	17,413	18,881	20,543	20,000
Germany	83,562	56,110	67,427	89,458	[3] 76,235
Great Britain	5,036	6,815	5,387	4,811	4,334
Greece	4,408	4,235	5,106	5,366	5,059
India (Burma)	39,843	46,799	52,590	48,034	54,155
Italy	10,710	17,131	22,062	24,475	23,590
Japan	3,239	2,700	2,941	3,337	3,610
Mexico	114,235	150,028	130,973	157,900	170,723
Northern Rhodesia	20,830	11,197	5,999	3,406	3,897
Norway	------	242	642	406	385
Poland	8,375	16,256	16,276	27,420	26,388
Rumania	230	402	433	496	655
Russia	394	555	[4] 625	[4] 823	1,000
South America	5,939	5,081	11,703	11,964	17,663
Southwest African Protectorate [5]	658	622	813	1,619	1,682
Spain	119,387	127,514	141,849	153,567	149,514
Sweden	306	119	477	723	522
Tunisia	14,552	14,090	14,291	16,013	18,106
Turkey	5,400	1,400	5,104	4,786	5,000
Union of South Africa	4,261	5,099	4,609	------	------
United States (refined)	437,845	515,395	555,913	636,790	661,239
Yugoslavia	8,497	9,260	11,487	10,956	9,809
Known production	1,096,000	1,245,000	1,345,000	1,549,000	1,596,000

[1] In addition to the countries listed, China smelts lead, but no reliable data of output are available. Official estimates of production in 1925 range from 1,500 to 3,500 tons.

[2] Data not available.

[3] Exclusive of Upper Silesia.

[4] Data for year ended Sept. 30.

[5] Data for year ended Mar. 31 of year following that stated.

IMPORTS AND EXPORTS

The total imports of lead into the United States in ore, base bullion, and as refined lead in 1926 were greater than in any previous year and amounted to 147,554 short tons, or more than one-fifth of the refined lead produced from domestic ore; nearly seven-eighths of this lead came from Mexico. Some of the imported ore and bullion leaves the country later in the form of pig lead and in manufactured articles, and some of the imported refined lead also is exported. These exports are shown in the table of foreign lead exported from the United States. The imports of lead for consumption are shown in the table on page 366. A description of the difference between general imports and imports for consumption and the method of warehouse transactions is given in Mineral Resources, Part I, 1919, page 324.

Exports of refined lead from domestic ore began in 1914, when the price of lead at London rose above the price at New York, and amounted to 58,722 short tons; in 1916 exports reached a maximum of 100,500 tons, but they declined immediately and for the years 1920 to 1926 have averaged annually 3,820 tons; the quantity exported in 1926 was 4,276 tons, of which 65 per cent went to Europe. The exports of refined lead from foreign ore are much larger than those from domestic ore and in 1926 amounted to 67,660 tons, a decrease of 31 per cent from 1925 but greater than those of any year before 1924.

In past years small quantities of domestic lead ore have been exported to Canada for treatment, but no ore was exported from 1920 to 1926.

Lead remaining in warehouse in the United States, December 31, 1917–1926, in pounds

[Stated in the form in which the material was entered for warehouse]

Year	Ore	Base bullion	Pigs, bars, and old	Year	Ore	Base bullion	Pigs, bars, and old
1917	27, 005, 477	20, 848, 468	5, 370, 445	1922	10, 470, 144	7, 076, 544	------------
1918	12. 805, 167	21, 192, 655	944, 483	1923	76, 031. 259	80, 306, 856	5, 234, 475
1919	29, 543, 811	61, 408, 873	468, 154	1924	103, 474, 370	95, 007, 016	10, 090, 668
1920	32, 923, 299	69, 517, 026	2, 644, 576	1925	105, 884, 711	91, 725, 008	[1] 16, 565, 672
1921	13, 679, 465	24, 692, 350	693, 440	1926	114, 630, 697	107, 582, 653	[1] 21, 820, 057

[1] Includes lead in reclaimed scrap, as follows: 1925, 241,078 pounds; 1926, 397,433 pounds. Corresponding figures for earlier years are not recorded separately.

Lead imported into the United States, 1917–1926, by classes, in pounds

[General imports]

Year	Lead in ore	Lead in base bullion	Pigs, bars, sheets, and old	Total lead content
1917	41, 292, 876	103, 664, 970	11, 585, 974	156, 543, 820
1918	37, 070, 340	149, 663, 889	10, 480, 531	197, 214, 760
1919	19, 573, 856	112, 024, 518	10, 214, 753	141, 813, 127
1920	29, 488, 816	96, 103, 603	71, 437, 108	197, 029, 527
1921	14, 234, 039	71, 733, 838	62, 602, 534	148, 570, 411
1922	24, 474, 481	124, 074, 465	7, 101, 623	155, 650, 569
1923	66, 882, 850	161, 496, 495	42, 198, 848	270, 578, 193
1924	95, 320, 168	155, 501, 350	24, 493, 746	275, 315, 264
1925	88, 962, 502	141, 253, 559	14, 042, 369	244, 258, 430
1926	116, 232, 669	156, 570, 738	22, 304, 620	295, 108, 027

Lead imported into the United States, in ore, base bullion, and refined, 1917–1926, by sources, in pounds

[General imports]

Year	Canada	Mexico	South America	Europe	Other countries	Total
1917	11, 738, 379	125, 782, 759	4, 556, 460	8, 945, 899	5, 520, 323	156, 543, 820
1918	28, 225, 878	162, 259, 199	1, 962, 124	62, 510	4, 705, 049	197, 214, 760
1919	10, 391, 115	125, 541, 614	5, 504, 416	89, 840	286, 142	141, 813, 127
1920	8, 199, 234	131, 815, 278	7, 085, 351	38, 766, 504	11, 163, 160	197, 029, 527
1921	8, 127, 158	106, 406, 238	2, 381, 365	30, 224, 701	1, 430, 949	148, 570, 411
1922	8, 663, 236	141, 216, 136	3, 803, 478	1, 454, 384	513, 335	155, 650, 569
1923	11, 399, 671	242, 352, 788	5, 300, 161	11, 004, 938	520, 635	270, 578, 193
1924	11, 022, 091	243, 161, 069	15, 820, 867	4, 857, 805	453, 432	275, 315, 264
1925	11, 646, 820	218, 873, 800	10, 621, 737	1, 594, 963	1, 521, 110	244, 258, 430
1926	12, 316, 740	254, 203, 852	24, 790, 075	3, 224, 504	572, 856	295, 108, 027

Lead imported for consumption in the United States, 1917–1926, by classes

Year	Lead in ore[1]		Base bullion		Pigs, bars, and old[2]		Sheets, pipe, and shot		Not otherwise specified	Total value
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value		
1917	5, 438, 931	$207, 370	6, 965, 849	$470, 539	1, 756, 223	$85, 743	12, 538	$2, 699	$10, 287	$776, 638
1918	6, 064, 902	344, 080	3, 559, 071	180, 070	1, 139, 950	56, 694	6, 892	624	36, 723	618, 191
1919	4, 106, 823	196, 363	31, 796, 693	1, 130, 937	10, 174, 115	415, 094	8, 018	628	17, 187	1, 760, 209
1920	13, 700, 499	908, 619	66, 816, 820	3, 340, 600	68, 901, 959	3, 887, 821	81, 396	5, 483	21, 328	8, 163, 851
1921	6, 842, 807	327, 046	56, 819, 980	1, 668, 410	61, 909, 094	1, 972, 716	3, 087	140	11, 204	3, 979, 516
1922	23, 649, 851	812, 603	55, 859, 422	1, 815, 142	8, 563, 110	335, 924	6, 018	697	12, 286	2, 976, 652
1923	22, 420, 046	1, 190, 414	11, 124, 151	626, 201	42, 925, 265	2, 510, 466	19, 525	4, 495	90, 027	4, 421, 603
1924	65, 147, 976	3, 145, 791	28, 796, 402	1, 542, 167	27, 362, 392	1, 850, 862	11, 666	4, 384	138, 637	6, 681, 841
1925	12, 706, 508	672, 112	24, 747, 665	1, 823, 566	15, 464, 205	1, 038, 350	27, 579	10, 429	139, 533	3, 683, 990
1926	58, 752, 911	3, 393, 039	13, 341, 038	972, 758	24, 365, 570	2, 191, 658	864, 342	101, 322	62, 895	6, 721, 672

[1] Includes also lead in matte beginning Sept. 22, 1922.

[2] Includes also imports of antimonial lead, antimonial scrap lead, babbitt metal, solder, etc., beginning with tariff of Sept. 22, 1922, except in 1925 and 1926, when antimonial lead is excluded.

Type metal imported for consumption in the United States, 1917–1926

Year	Type metal		Lead content	
	Pounds	Value	Pounds	Percentage
1917				
1918	551, 794	$35, 938	513, 166	93. 0
1919	13, 394, 803	816, 642	11, 000, 498	82. 1
1920	29, 887, 353	1, 349, 495	25, 761, 543	86. 2
1921	38, 971, 351	1, 191, 553	30, 706, 845	78. 8
1922	44, 895, 120	1, 120, 814	33, 944, 199	75. 6
1923	(1)	(1)	7, 353, 463	(1)
1924	(1)	(1)	1, 288, 766	(1)
1925	[2]6, 009, 161	463, 134	4, 309, 549	71. 7
1926	[2]8, 621, 175	912, 331	7, 053, 849	81. 8

(1) Figures not available.

[2] Includes antimonial lead.

Refined lead, from domestic ores, exported from the United States, 1917–1926

Year	Short tons	Value	Year	Short tons	Value
1917	53, 688	$9, 560, 598	1922	5, 823	$604, 605
1918	41, 831	5, 889, 381	1923	1, 999	260, 487
1919	10, 510	1, 471, 256	1924	5, 332	711, 147
1920	2, 730	462, 223	1925	4, 955	784, 440
1921	1, 624	177, 926	1926	4, 276	601, 061

Foreign lead exported from the United States, 1917–1926

Year	Exported from warehouse			Exported in manufactures with benefit of drawback (pounds)
	Pigs, bars, and old [1]		All other manufactures	
	Pounds	Value		
1917	75, 304, 480	$6, 650, 157	$900	15, 074, 947
1918	118, 832, 344	8, 309, 798	4, 347	6, 852, 173
1919	81, 951, 396	4, 536, 273	44	3, 872, 130
1920	34, 725, 501	2, 570, 535	35, 146	12, 350, 794
1921	50, 000, 259	2, 284, 107	613	18, 738, 927
1922	64, 709, 305	3, 177, 360	146	11, 354, 070
1923	97, 471, 326	5, 195, 256	(2)	25, 052, 107
1924	153, 515, 863	9, 685, 619	(2)	30, 549, 116
1925	197, 128, 517	14, 910, 891	(2)	23, 398, 305
1926	135, 319, 321	8, 904, 603	(2)	35, 910, 934

[1] Since July 1, 1915, the Bureau of Foreign and Domestic Commerce has classed all foreign lead smelted or refined in this country and exported as "domestic exports of pigs, bars, etc., produced from foreign ore." The above figures include also the exports of foreign lead imported in the form of pigs and bars.

[2] Not separately classified after 1922.

Domestic and foreign pig lead exported from the United States, 1925–26, by destinations

Destination	Domestic		Foreign	
	Short tons	Value	Short tons	Value
1925				
North America:				
Canada	167	$31, 721		
Cuba	183	29, 589	103	$15, 438
Mexico	65	13, 559	59	9, 301
Panama	126	24, 130	25	4, 393
Other	66	13, 331	5	913
	607	112, 330	192	30, 045
South America:				
Argentina	344	51, 503	1, 473	220, 643
Brazil	174	29, 402	2, 113	321, 625
Chile	12	2, 649	7	1, 060
Colombia	226	34, 128	4	808
Guiana, Dutch	1	235		
Peru	175	31, 340	136	23, 971
Uruguay	392	57, 115	137	19, 762
Other	21	4, 435	7	1, 546
	1, 345	210, 807	3, 877	589, 415
Europe:				
Belgium	448	68, 350	3, 339	510, 981
France	812	125, 682	8, 586	1, 264, 196
Germany	347	53, 454	25, 830	3, 940, 485
Italy	519	74, 600	2, 055	305, 045
Netherlands	560	86, 144	4, 654	704, 681
Sweden			1, 994	306, 283
United Kingdom	224	35, 014	45, 683	6, 916, 744
Other	29	4, 950	521	80, 508
	2, 939	448, 194	92, 662	14, 028, 923
Asia:				
China	2	490	448	63, 627
Japan			1, 344	190, 867
Philippine Islands	52	10, 888	19	4, 182
Other	10	1, 693	22	3, 832
	64	13, 071	1, 833	262, 508
Oceania, including Australia	(1)	38		
	4, 955	784, 440	98, 564	14, 910, 891

[1] Less than 1 ton.

Domestic and foreign pig lead exported from the United States, 1925–26, by destinations—Continued

Destination	Domestic		Foreign	
	Short tons	Value	Short tons	Value
1926				
North America:				
Canada	127	$27, 441	(1)	$32
Cuba	60	11, 152	302	42, 442
Mexico	59	12, 489	56	7, 942
Panama	27	5, 340		
Other	42	8, 504	7	1, 141
	315	64, 926	365	51, 557
South America:				
Argentina	41	7, 539	386	50, 852
Brazil	46	9, 259	1, 709	225, 306
Chile	143	23, 320	972	142, 584
Colombia	245	37, 930	18	2, 820
Guiana, Dutch	3	546	392	58, 050
Peru	29	4, 840	44	7, 003
Uruguay	29	3, 697	450	61, 265
Other	16	3, 153	56	8, 944
	552	90, 284	4, 027	556, 824
Europe:				
Belgium	336	44, 775	2, 016	267, 945
France	392	50, 200	7, 416	982, 599
Germany	896	115, 548	16, 827	2, 185, 163
Italy			840	124, 789
Netherlands	56	6, 675	1, 714	226, 698
Sweden	112	14, 350	2, 829	365, 754
United Kingdom	925	120, 840	14, 370	1, 937, 448
Other	58	8, 381	280	36, 265
	2, 775	360, 769	46, 292	6, 126, 661
Asia:				
China	(1)	12	2, 864	355, 779
Japan, including Chosen	504	64, 209	14, 022	1, 800, 822
Philippine Islands	72	13, 175	38	6, 461
Other	56	7, 141	52	6, 499
	632	84, 537	16, 976	2, 169, 561
Africa	2	545		
	4, 276	601, 061	67, 660	8, 904, 603

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[1] Less than 1 ton.

CONSUMPTION

Apparent consumption of refined primary lead in the United States, refinery stocks disregarded, 1922–1926, in short tons

	1922	1923	1924	1925	1926
Supply:					
Stock in bonded warehouse Jan. 1	347		2, 617	5, 045	8, 162
Imports of pigs, bars, and old	3, 551	21, 099	12, 247	7, 021	11, 152
Production	532, 662	618, 322	690, 493	766, 969	798, 941
	536, 560	639, 421	705, 357	779, 035	818, 255
Withdrawn:					
Exports of foreign lead—					
From warehouse	32, 355	48, 736	76, 758	98, 564	67, 660
In manufactures, with benefit of drawback	5, 677	12, 526	15, 275	11, 699	17, 955
Exports of domestic lead	5, 823	1, 999	5, 332	4, 955	4, 276
Stock in bonded warehouse Dec. 31		2, 617	5, 045	8, 162	10, 711
	43, 855	65, 878	102, 410	123, 380	100, 602
Apparent consumption	492, 705	573, 543	602, 947	655, 655	717, 653

PRICES AND VALUE

The average as calculated on the American Metal Market's quoted prices of lead at New York, outside market, including shipment from west, was 8.45 cents a pound in 1926. This quotation was slightly lower than the average quotation in 1925 (9.1 cents), but was higher than the average annual quotation recorded for any other year except 1917.

The highest price of the year was 9.37½ cents, quoted at the beginning of January, and there was no change until January 21, when it fell to 9.32½ cents. Quotations fluctuated through the spring months and the general trend was downward until the latter part of May, when the price reached 7.65 cents—the lowest quotation of the year. A recovery then began which brought the quotation to 9 cents the last of July. Quotations ranged from 8.92½ to 8 cents from August through November. The quotation from December 15 to the close of the year was 7.80 cents.

The following table gives the average quotations on lead, outside market, New York, 1924 to 1926, and in London, 1926, by months:

Average monthly quoted price of lead at New York, 1924–1926, and at London, 1926, in cents a pound [1]

Month	At New York (outside market)			At London,[2] 1926	Month	At New York (outside market)			At London,[2] 1926
	1924	1925	1926			1924	1925	1926	
January	8.43	10.33	9.35	7.54	July	7.19	8.31	8.63	6.90
February	9.18	9.41	9.17	7.36	August	7.95	9.81	8.91	7.11
March	9.33	8.90	8.50	6.86	September	8.07	9.61	8.78	6.96
April	8.20	8.02	8.04	6.25	October	8.37	9.68	8.40	6.65
May	7.32	8.20	7.81	6.13	November	9.01	9.84	8.00	6.34
June	7.01	8.44	8.11	6.51	December	9.62	9.40	7.86	6.27

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[1] American Metal Market, monthly review section.

[2] Conversion of English quotations into American money based on average monthly rate of exchange, as recorded by the Federal Reserve Board of the Treasury.

The following prices were quoted on lead by the American Smelting & Refining Co. for 1925 and 1926 in cents a pound:

1925:	
Jan. 2	9.75
Jan. 5	10.00
Jan. 8	10.25
Jan. 12	10.50
Jan. 21	10.00
Jan. 30	9.75
Feb. 13	9.50
Feb. 17	9.25
Mar. 3	9.00
Mar. 26	8.75
Mar. 30	8.50
Apr. 7	8.25
Apr. 16	8.00
Apr. 18	7.85
Apr. 21	7.75
May 14	7.90
May 19	8.00
May 22	8.15
May 25	8.25
May 28	8.40
June 18	8.30
June 24	8.20
June 29	8.10
June 30	8.00
July 20	8.10
July 21	8.20
July 30	8.30
Aug. 3	8.50
Aug. 5	8.75
Aug. 8	8.90
Aug. 11	9.00
Aug. 13	9.15
Aug. 14	9.25
Aug. 19	9.40
Aug. 26	9.50
Nov. 2	9.75
Nov. 30	9.50
Dec. 8	9.25

1926:	
Feb. 11	9.15
Feb. 25	9.00
Mar. 1	8.90
Mar. 3	8.75
Mar. 8	8.60
Mar. 10	8.40
Mar. 12	8.20
Apr. 7	8.00
Apr. 19	7.85
May 11	7.75
May 21	7.65
June 10	7.80
June 11	8.00
June 15	8.15
June 16	8.25
July 13	8.40
July 14	8.50
July 23	8.65
July 26	8.75
July 30	8.90
Sept. 13	8.75
Oct. 1	8.65
Oct. 6	8.50
Oct. 13	8.35
Oct. 25	8.25
Nov. 1	8.10
Nov. 3	8.00
Dec. 6	7.90
Dec. 15	7.80

The average selling value of lead in 1926, based on total sales by producers, was 8 cents a pound, the same as in 1924 but lower than in 1925 when it was 8.7 cents a pound.

GOLD, SILVER, COPPER, LEAD, AND ZINC IN MONTANA

(MINE REPORT)

By C. N. GERRY[1]

SUMMARY

The value of the mine production of gold, silver, copper, lead, and zinc in Montana in 1926 was nearly 3 per cent less than that in 1925, largely because of the great decrease in the output of copper. There were also declines in the output of gold and silver, but the output of lead and zinc increased considerably.

An exact summary of the metal output of Montana by years has never been compiled, but an estimate of $1,099,019,699 was given by the Director of the Mint[2] for the gold, silver, copper, and lead produced from 1862 to 1903. Adding to this total the value of these metals and that of zinc from 1904 to 1926 gives a total of $2,565,468,595 for the State from 1862 to 1926.

The total value of the mine production of gold, silver, copper, lead, and zinc in Montana for the years 1904 to 1926, as recorded in Mineral Resources of the United States, has been $1,466,448,896. Details of production are as follows: Ore, old tailings, etc., 118,186,338 short tons; gold, $72,468,069; silver, 290,340,255 fine ounces; copper, 5,834,645,707 pounds; lead, 420,455,154 pounds; and zinc, 2,162,027,542 pounds.

Silver Bow County, which includes the Butte or Summit Valley district, continued to produce most of the silver, copper, lead, and zinc and produced more than half the gold in 1926. Published reports show that the Anaconda Copper Mining Co., Butte & Superior Mining Co., Butte Copper & Zinc Co., and Jardine Mining Co. paid dividends amounting to $9,891,294, but part of the Anaconda dividend was paid from receipts from operations in other States. No complete record of Montana dividends has ever been kept, but adding the dividends of the last two years to an estimate made by one of the mining journals[3] gives a total of $354,531,901 to the end of 1926. The Anaconda, Amalgamated, North Butte, Butte & Superior, and Parrot companies have paid the larger part of this total.

The prices given in the table that follows are those at which the values for metals in this report have been calculated. The silver prices for 1917 and 1919 are dealers' buying price, New York; for 1918, average price as stated by the Bureau of the Mint; for 1920 to 1922, New York market price for domestic silver only; for 1923, average price under the Pittman Act, from January 1 to June 2, for domestic silver, and average New York price for all silver after that period; for 1924 and later years, average New York price for bar silver. The copper, lead, and zinc prices are weighted averages, for each year, of all grades of primary metal sold by producers.

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[1] The valuable assistance of B. N. Lowry and Paul Luff, of the Bureau of Mines, is acknowledged.

[2] Director of the Mint Ann. Rept. for 1904, p. 93.

[3] Mining Truth, May 16, 1925, p. 93.

Prices of silver, copper, lead, and zinc, 1917–1926

Year	Silver	Copper	Lead	Zinc	Year	Silver	Copper	Lead	Zinc
	Per fine ounce	*Per pound*	*Per pound*	*Per pound*		*Per fine ounce*	*Per pound*	*Per pound*	*Per pound*
1917	$0.824	$0.273	$0.086	$0.102	1922	$1.00	$0.135	$0.055	$0.057
1918	1.00	.247	.071	.091	1923	.82	.147	.070	.068
1919	1.12	.186	.053	.073	1924	.67	.131	.080	.065
1920	1.09	.184	.080	.081	1925	.694	.142	.087	.076
1921	1.00	.129	.045	.050	1926	.624	.140	.080	.075

Mine production of gold, silver, copper, lead, and zinc in Montana, 1917–1926

Year	Mines producing		Ore, old tailings, etc. (short tons)	Gold		Silver		Copper		Lead		Zinc		Total value
	Lode	Placer		Fine ounces	Value	Fine ounces	Value	Pounds	Value	Pounds	Value	Pounds	Value	
1917	518	99	6,307,164	170,147.11	$3,517,253	13,128,142	$10,817,589	274,462,574	$74,928,283	21,951,220	$1,887,805	186,259,331	$18,998,452	$110,149,382
1918	407	86	7,823,967	150,192.96	3,104,764	16,797,479	16,797,479	323,174,850	79,824,188	37,135,875	2,636,647	209,258,148	19,042,491	121,405,569
1919	395	62	4,183,594	107,856.32	2,229,588	12,541,181	14,046,123	169,981,288	31,616,520	34,437,764	1,825,201	168,763,823	12,319,759	62,037,191
1920	392	65	5,241,615	89,550.11	1,851,165	12,579,178	13,711,304	177,059,260	32,578,904	31,253,916	2,500,313	184,337,786	14,931,361	65,573,047
1921	348	97	1,324,801	71,631.91	1,480,763	6,558,713	6,558,713	48,098,730	6,204,736	20,366,917	916,511	23,275,966	1,163,798	16,324,521
1922	315	78	4,385,878	80,145.62	1,656,757	12,468,151	12,468,151	165,754,442	22,376,850	29,767,479	1,637,211	119,069,818	6,786,980	44,925,949
1923	304	78	5,743,535	85,079.43	1,758,748	13,380,862	10,972,307	224,125,264	32,946,414	35,945,623	2,516,194	141,460,392	9,619,307	57,812,970
1924	302	86	4,652,482	97,854.16	2,022,825	13,289,303	8,903,833	249,152,062	32,638,920	39,476,008	3,158,081	128,475,218	8,350,889	55,074,548
1925	331	93	4,405,008	82,122.85	1,697,630	13,158,191	9,131,784	268,910,847	38,185,340	37,530,644	3,265,166	115,316,922	8,764,086	61,044,006
1926	335	58	4,470,055	60,504.11	1,250,731	12,769,092	7,967,913	255,372,862	35,752,201	42,306,193	3,384,495	147,401,507	11,055,113	59,410,453

Gold and silver produced at placer mines in Montana, 1917–1926

Year	Gold		Silver	
	Fine ounces	Value	Fine ounces	Value
1917	22,594.17	$467,063	3,551	$2,926
1918	19,167.72	396,232	3,166	3,166
1919	14,097.92	291,430	2,309	2,586
1920	13,977.76	288,946	2,210	2,409
1921	10,988.91	227,161	1,591	1,591
1922	3,472.65	71,786	652	652
1923	1,972.68	40,779	360	295
1924	1,323.59	27,361	187	125
1925	1,905.25	39,385	405	281
1926	1,104.30	22,828	162	101

GOLD

The output of gold in Montana in 1926, the smallest since the early years of mining, was 26 per cent less than that of 1925, due chiefly to the large decreases in the output of gold from the Jardine mine, at Jardine, Park County, and from the Jib mine, at Basin, Jefferson County. The output has decreased from $5,004,195 in 1915 to $1,250,731 in 1926. Silver Bow County reported more than half the total for the State in 1926, but the output decreased 9 per cent as compared with 1925. Lewis and Clark County was second, followed by Park, Jefferson, Broadwater, and Madison Counties. The largest increases were made from the New Gould property near Wilborn, Lewis and Clark County, and from the Ohio Keating mine near Radersburg, Broadwater County. Amalgamation and cyanidation mills produced 21 per cent of the gold, making an average recovery of $4.12 in gold and 64 cents in silver to the ton of ore and old tailings treated. Concentrates of all kinds yielded more than 62 per cent of the total output of gold, and crude ore shipped to smelters yielded 14 per cent. Dry and siliceous ore and old tailings yielded 39 per cent of the gold; copper ore, old tailings, etc., 45 per cent; lead-zinc ore and old tailings 9 per cent; lead ore, old tailings, etc., 4 per cent; zinc ore and copper-lead ore 1 per cent; and placers 2 per cent. There was a decided decrease (more than 14,200 ounces) in gold from siliceous ore, especially gold ore, and a decrease of more than 5,000 ounces from copper ore.

Seven properties produced 72 per cent of the total output of gold. The Anaconda property at Butte ranked first, followed by the Jardine mine in the Sheepeater district, Park County; the Drumlummon mine near Marysville and the New Gould property near Wilborn, both in Lewis and Clark County; the Jib mine at Basin, Jefferson County; the Ohio Keating property near Radersburg, Broadwater County; and the Butte & Superior property at Butte, Silver Bow County.

SILVER

The output of silver from mines in Montana in 1926 was 3 per cent less than in 1925 but exceeded the yearly average of 12,667,029 ounces for the decade 1917 to 1926. Nearly 61 per cent of the silver was obtained from copper ore, old tailings, etc.; 26 per cent from lead-zinc ore and old tailings; and 9 per cent from lead ore, old tailings, etc., and copper-lead ore. Silver Bow County, chiefly the Butte district, produced 87 per cent of the total. Concentrates yielded 92 per cent of the silver, first-class smelting ore 6 per cent, old tailings and slag smelted more than 1 per cent, and bullion and precipitates from ore treated at cyanidation and amalgamation mills less than 1 per cent.

Seven properties produced 84 per cent of the silver; each of these yielded more than 400,000 ounces and two of them—the copper mines of the Anaconda Copper Mining Co. and the Butte & Superior mine—more than 1,800,000 ounces each. The other five large producers were the Silver Dyke, Emma, Elm Orlu, Poser, and Anselmo properties.

COPPER

The mine production of copper in 1926 was 5 per cent less in quantity than in 1925. As the price of copper was slightly less than in 1925 and the demand for copper was oversupplied no effort was made to work the mines and plants at maximum capacity.

The total output of copper, except for 2,381,996 pounds, came from Silver Bow County, which includes the Butte district. Copper ore, old tailings, etc., yielded 98 per cent of the copper. Concentrates yielded 92 per cent of the copper, and crude ore of all kinds shipped to smelters 5 per cent; the remainder was represented by copper saved from old tailings and pond slimes, slag, and precipitates. The sulphide copper ore of smelting grade yielded 13,560,764 pounds, an average of 4.85 per cent, and the oxidized ore 36,767 pounds, an average of 5.41 per cent. Slag resmelted, old tailings and pond slimes smelted, and copper precipitates from mine waters yielded 7,241,170 pounds.

Four properties in Montana each produced more than 6,000,000 pounds of copper in 1926. The mines of the Anaconda Copper Mining Co. yielded more than all others combined; the other three properties were the Butte & Superior, Anselmo, and East Butte. Other large producers of copper were the Silver Dyke, North Butte, and Elm Orlu properties. Considerable copper was also recovered from old tailings resmelted at Anaconda.

LEAD

The mine production of lead in Montana in 1926 was the largest ever recorded and was 13 per cent more in quantity than in 1925. Nearly 65 per cent of the output was derived from mines in Silver Bow County and most of the remainder from Cascade, Judith Basin, Jefferson, and Beaverhead Counties. Lead-zinc ore and old tailings yielded 70 per cent of the lead, lead ore with old tailings and slag 20 per cent, copper-lead ore 9 per cent, and zinc ore nearly 1 per cent. Concentrates yielded 87 per cent of the total output of lead, crude ore of all kinds shipped to smelters 7 per cent, and old slag 6 per cent. The greater part of the lead from Montana mines, saved at East Helena, arrives at the smelter as residues from the zinc plant at Great Falls or as lead concentrate from the mill at Anaconda.

Six properties—Emma, Butte & Superior, Poser, Silver Dyke, Elm Orlu, and Block P., each yielding more than 2,000,000 pounds—produced most of the lead. Other large producers were the Moulton, the Hecla slag dump, and the zinc mines of the Anaconda Copper Mining Co.

ZINC

The mine production of zinc in Montana in 1926 was 28 per cent greater in quantity than in 1925 and was the largest output since 1920. The zinc output from the Butte & Superior mine was 23 per cent more than that of 1925, and the Emma, Elm Orlu, and Poser mines also reported good increases. The mines at Butte, Silver Bow County, produced 97 per cent of the total zinc output. At Great Falls the enlarged electrolytic zinc plant of the Anaconda Copper Mining Co. was operated continuously on concentrate from Montana and material from other western States. A few cars of zinc material were shipped to eastern smelters, and some concentrate was shipped for export to Belgium, but most of the lead-zinc ore was treated at the Timber Butte custom mill at Butte and the custom plant at Anaconda. The Butte & Superior Mining Co., which shipped its entire lead-zinc product to Anaconda for milling, produced approximately 40 per cent of the zinc of the State. Lead-zinc ore and old tailings yielded 97 per cent of the zinc, and zinc ore 3 per cent.

Eight properties at Butte—the Butte & Superior, Emma, Elm Orlu, Poser, Moulton, Anaconda (zinc), North Butte, and Anselmo—produced nearly all the zinc.

The following tables show the relative importance of Silver Bow County or the Butte district. Cascade County was the only other county which produced metals valued at more than $1,000,000 in 1926.

Mine production of gold, silver, copper, lead, and zinc in Montana, 1925–26, by counties

1925

County	Ore, old tailings, etc. (short tons)	Gold					Silver (lode and placer)	
		Lode		Placer		Total value	Fine ounces	Value
		Fine ounces	Value	Fine ounces	Value			
Beaverhead	51,821	972.97	$20,113	48.32	$999	$21,112	122,875	$85,275
Broadwater	2,060	603.67	12,479	235.69	4,872	17,351	13,529	9,389
Cascade	193,289	718.85	14,860	--------	--------	14,860	639,497	443,811
Deer Lodge	8,113	1,703.91	35,223	14.42	298	35,521	49,726	34,510
Fergus	203	435.95	9,012	20.52	424	9,436	2,466	1,711
Gallatin	44	4.31	89	--------	--------	89	18	12
Granite	9,016	1,272.46	26,304	145.31	3,004	29,308	120,695	83,762
Jefferson	120,349	12,592.30	260,306	18.39	380	260,686	355,434	246,671
Judith Basin	29,292	439.24	9,080	--------	--------	9,080	148,715	103,208
Lewis and Clark	17,422	5,623.74	116,253	244.10	5,046	121,299	42,211	29,294
Lincoln	12,624	101.54	2,099	--------	--------	2,099	9,769	6,780
Madison	21,701	5,062.06	104,642	529.65	10,949	115,591	43,154	29,949
Meagher	170	26.41	546	9.68	200	746	154	107
Mineral	5,005	12.33	255	211.69	4,376	4,631	11,419	7,925
Missoula	1,682	143.48	2,966	38.31	792	3,758	19,264	13,370
Park	69,409	14,182.44	293,177	1.06	22	293,199	1,511	1,049
Phillips	15	8.71	180	--------	--------	180	214	148
Powell	143	150.06	3,102	313.28	6,476	9,578	5,628	3,906
Ravalli	74	20.46	423	13.45	278	701	444	308
Sanders	175	10.84	224	--------	--------	224	3,166	2,197
Silver Bow	3,862,401	36,131.87	746,912	59.98	1,240	748,152	11,568,302	8,028,402
Toole	--------	--------	--------	1.40	29	29	--------	--------
	4,405,008	80,217.60	1,658,245	1,905.25	39,385	1,697,630	13,158,191	9,131,784

Mine production of gold, silver, copper, lead, and zinc in Montana, 1925–26, by counties—Continued

1925—Continued

County	Copper		Lead		Zinc		Total value
	Pounds	Value	Pounds	Value	Pounds	Value	
Beaverhead	296, 219	$42, 063	3, 096, 647	$269, 408	-----	-----	$417, 858
Broadwater	4, 138	588	376, 418	32, 748	-----	-----	60, 076
Cascade	1, 342, 458	190, 629	3, 705, 994	322, 421	101, 960	$7, 749	979, 470
Deer Lodge	2, 067	293	-----	-----	-----	-----	70, 324
Fergus	-----	-----	-----	-----	-----	-----	11, 147
Gallatin	-----	-----	4, 085	355	-----	-----	456
Granite	106, 106	15, 067	254, 245	22, 119	203, 149	15, 439	165, 695
Jefferson	239, 246	33, 973	1, 435, 132	124, 857	396, 396	30, 126	696, 313
Judith Basin	5, 918	840	2, 839, 317	247, 021	3, 315	252	360, 401
Lewis and Clark	18, 357	2, 607	286, 147	24, 895	34, 964	2, 657	180, 752
Lincoln	-----	-----	526, 586	45, 813	336, 600	25, 582	80, 274
Madison	174, 722	24, 810	429, 250	37, 345	117, 285	8, 914	216, 609
Meagher	-----	-----	13, 715	1, 193	-----	-----	2, 046
Mineral	-----	-----	86, 643	7, 538	280, 500	21, 318	41, 412
Missoula	61, 421	8, 722	209, 739	18, 247	-----	-----	44, 097
Park	-----	-----	-----	-----	-----	-----	294, 248
Phillips	-----	-----	-----	-----	-----	-----	328
Powell	745	106	48, 075	4, 183	-----	-----	17, 773
Ravalli	533	76	-----	-----	-----	-----	1, 085
Sanders	21, 960	3, 118	36, 449	3, 171	62, 832	4, 775	13, 485
Silver Bow	266, 636, 957	37, 862, 448	24, 182, 202	2, 103, 852	113, 779, 921	8, 647, 274	57, 390, 128
Toole	-----	-----	-----	-----	-----	-----	29
	268, 910, 847	38, 185, 340	37, 530, 644	3, 265, 166	115, 316, 922	8, 764, 086	61, 044, 006

1926

County	Ore, old tailings, etc. (short tons)	Gold					Silver (lode and placer)	
		Lode		Placer		Total value	Fine ounces	Value
		Fine ounces	Value	Fine ounces	Value			
Beaverhead	20, 487	331. 03	$6, 843	36. 72	$759	$7, 602	41, 755	$26, 055
Broadwater	17, 777	2, 754. 03	56, 931	123. 94	2, 562	59, 493	35, 682	22, 265
Cascade	251, 891	484. 72	10, 020	-----	-----	10, 020	809, 937	505, 401
Deer Lodge	125	5. 85	121	10. 45	216	337	4, 501	2, 808
Fergus	126	160. 02	3, 308	-----	-----	3, 308	2, 356	1, 470
Granite	11, 445	803. 32	16, 606	101. 92	2, 107	18, 713	161, 708	100, 906
Jefferson	66, 729	4, 022. 72	83, 157	29. 22	604	83, 761	353, 378	220, 508
Judith Basin	28, 275	345. 49	7, 142	1. 50	31	7, 173	143, 561	89, 582
Lewis and Clark	36, 453	9, 580. 67	198, 050	68. 55	1, 417	199, 467	81, 211	50, 676
Lincoln	6, 536	79. 00	1, 633	-----	-----	1, 633	7, 578	4, 729
Madison	5, 492	2, 239. 27	46, 290	253. 44	5, 239	51, 529	26, 046	16, 253
Meagher	2, 870	-----	-----	2. 47	51	51	2, 072	1, 293
Mineral	10, 291	6. 44	133	90. 75	1, 876	2, 009	24, 586	15, 342
Missoula	419	27. 53	569	7. 88	163	732	4, 844	3, 023
Park	24, 631	5, 388. 30	111, 386	-----	-----	111, 386	631	394
Phillips	6	31. 73	656	-----	-----	656	175	109
Powell	430	253. 29	5, 236	278. 25	5, 752	10, 988	5, 254	3, 278
Ravalli	239	67. 92	1, 404	38. 36	793	2, 197	1, 342	837
Sanders	248	1. 89	39	-----	-----	39	1, 575	983
Silver Bow	3, 985, 585	32, 816. 59	678, 379	60. 85	1, 258	679, 637	11, 060, 900	6, 902, 001
	4, 470, 055	59, 399. 81	1, 227, 903	1, 104. 30	22, 828	1, 250, 731	12, 769, 092	7, 967, 913

Mine production of gold, silver, copper, lead, and zinc in Montana, 1925–26, by counties—Continued

1926—Continued

County	Copper		Lead		Zinc		Total value
	Pounds	Value	Pounds	Value	Pounds	Value	
Beaverhead	145, 123	$20, 317	1, 807, 635	$144, 611	----------	----------	$198, 585
Broadwater	3, 768	528	854, 506	68, 360	13, 650	$1, 024	151, 670
Cascade	1, 717, 705	240, 479	5, 057, 551	404, 604	656, 881	49, 266	1, 209, 770
Deer Lodge	57	8	----------	----------	----------	----------	3, 153
Fergus	----------	----------	----------	----------	----------	----------	4, 778
Granite	13, 764	1, 927	309, 997	24, 800	474, 953	35, 621	181, 967
Jefferson	247, 074	34, 590	1, 964, 025	157, 122	1, 096, 183	82, 214	578, 195
Judith Basin	1, 234	173	2, 774, 492	221, 959	----------	----------	318, 887
Lewis and Clark	190, 093	26, 613	316, 125	25, 290	73, 558	5, 517	307, 563
Lincoln	3, 156	442	461, 471	36, 918	530, 326	39, 774	83, 496
Madison	1, 951	273	467, 439	37, 395	150, 891	11, 317	116, 767
Meagher	11, 948	1, 673	413, 001	33, 040	----------	----------	36, 057
Mineral	135	19	381, 057	30, 484	994, 167	74, 562	122, 416
Missoula	26, 680	3, 735	29, 621	2, 370	----------	----------	9, 860
Park	----------	----------	----------	----------	----------	----------	111, 780
Phillips	----------	----------	----------	----------	----------	----------	765
Powell	349	49	63, 819	5, 105	----------	----------	19, 420
Ravalli	5, 927	830	15, 325	1, 226	----------	----------	5, 090
Sanders	13, 032	1, 824	33, 521	2, 682	105, 196	7, 890	13, 418
Silver Bow	252, 990, 866	35, 418, 721	27, 356, 608	2, 188, 529	143, 305, 702	10, 747, 928	55, 936, 816
	255, 372, 862	35, 752, 201	42, 306, 193	3, 384, 495	147, 401, 507	11, 055, 113	59, 410, 453

Ore, old tailings, etc., sold or treated, lode mines producing, and average value of ore, etc., in Montana, 1925–26, by counties

County	Ore, old tailings, etc. (short tons)		Lode mines producing		Average value per ton in all metals		Average value per ton in gold and silver	
	1925	1926	1925	1926	1925	1926	1925	1926
Beaverhead	51, 821	20, 487	16	19	$8. 04	$9. 66	$2. 03	$1. 61
Broadwater	2, 060	17, 777	22	27	26. 78	8. 39	10. 60	4. 45
Cascade	193, 289	251, 891	10	13	5. 07	4. 80	2. 37	2. 05
Deer Lodge	8, 113	125	7	5	8. 63	23. 50	8. 60	23. 43
Fergus	203	126	8	3	52. 82	37. 92	52. 82	37. 92
Gallatin	44	----------	2	------	10. 36	--------	2. 30	--------
Granite	9, 016	11, 445	19	25	18. 04	15. 71	12. 20	10. 27
Jefferson	120, 349	66, 729	58	54	5. 78	8. 66	4. 21	4. 55
Judith Basin	29, 292	28, 275	5	5	12. 30	11. 28	3. 83	3. 42
Lewis and Clark	17, 422	36, 453	38	38	10. 08	8. 40	8. 35	6. 82
Lincoln	12, 624	6, 536	3	2	6. 36	12. 77	. 70	. 97
Madison	21, 701	5, 492	66	62	9. 47	20. 30	6. 20	11. 38
Meagher	170	2, 870	3	6	10. 85	12. 55	3. 84	. 45
Mineral	5, 005	10, 291	3	7	7. 40	11. 71	1. 63	1. 50
Missoula	1, 682	419	2	2	25. 75	23. 14	9. 71	8. 57
Park	69, 409	24, 631	1	2	4. 24	4. 54	4. 24	4. 54
Phillips	15	6	1	2	21. 87	127. 50	21. 87	127. 50
Powell	143	430	13	11	78. 60	31. 73	48. 61	19. 70
Ravalli	74	239	2	2	10. 91	17. 97	9. 88	9. 37
Sanders	175	248	5	6	77. 06	54. 10	13. 83	4. 12
Silver Bow	3, 862, 401	3, 985, 585	47	44	14. 68	13. 86	2. 27	1. 90
	4, 405, 008	4, 470, 055	331	335	13. 69	13. 13	2. 45	2. 06

Production of placer mines in Montana, 1925–26, by counties

County	1925					1926				
	Mines		Gold	Silver (fine ounces)	Total value	Mines		Gold	Silver (fine ounces)	Total value
	Hydraulic and sluicing	Drift				Hydraulic and sluicing	Drift			
Beaverhead	7	1	$999	4	$1,002	6	------	$759	5	$762
Broadwater	12	------	4,872	54	4,909	6	------	2,562	25	2,578
Deer Lodge	2	------	298	--------	298	1	------	216	--------	216
Fergus	2	------	424	--------	424	--------	------	--------	--------	--------
Granite	8	1	3,004	41	3,032	5	------	2,107	21	2,120
Jefferson	4	------	380	7	385	3	------	604	9	610
Judith Basin	--------	------	--------	--------	--------	1	------	31	--------	31
Lewis and Clark	11	3	5,046	67	5,092	3	2	1,417	9	1,423
Madison	11	------	10,949	133	11,041	6	------	5,239	37	5,262
Meagher	3	------	200	1	201	1	------	51	--------	51
Mineral	10	------	4,376	8	4,382	9	------	1,876	--------	1,876
Missoula	2	------	792	1	793	1	------	163	--------	163
Park	--------	1	22	--------	22	--------	------	--------	--------	--------
Powell	10	2	6,476	82	6,533	9	------	5,752	42	5,778
Ravalli	1	------	278	--------	278	3	------	793	2	794
Silver Bow	1	------	1,240	7	1,245	2	------	1,258	12	1,265
Toole	--------	1	29	--------	29	--------	------	--------	--------	--------
	84	9	39,385	405	39,666	56	2	22,828	162	22,929

MINING INDUSTRY

The average metal prices showed comparatively little change in 1926, and there was no great change in the value of Montana's metal output. The mines at Butte were worked uninterruptedly but not at their maximum capacity. Montana retained its place as the second largest silver producer in the United States but dropped to third place, after Arizona and Utah, in the production of copper. The year was free from labor trouble and serious accidents which often interrupt mining, and much time was given to development work and improvements at the plants at Anaconda and Great Falls. The Anaconda Copper Mining Co., the largest operator in the State, was producing copper at the smelting plant at Anaconda at the rate of 21,000,000 pounds a month and zinc from the Great Falls plant at the rate of nearly 19,000,000 pounds a month. As the average price of copper was only 14 cents a pound, rigid economy was exercised in mining, and at Butte selective mining was urged to keep the mill heads up to a definite standard. As deep mining becomes increasingly necessary, the Anaconda Copper Mining Co. spent nearly $1,500,000 to equip the Mountain Con, Badger State, and Belmont mines with electric hoists capable of lifting ore from a depth of 5,000 feet.

The quantity of ore, old tailings, slag, etc., sold or treated in Montana in 1926 increased more than 1 per cent, but the average value in recovered metals a ton decreased from $13.69 in 1925 to $13.13 in 1926. The increase in the output of lead-zinc ore, lead ore, and copper-lead ore more than offset the decreases in gold ore, silver ore, and copper ore. Of the total ore, etc., 85 per cent was concentrated, 1 per cent was treated in gold and silver mills, and 4 per cent was shipped for smelting. The remaining 10 per cent consisted of slag, which was resmelted, and old tailings and pond slimes, which were smelted, concentrated, or cyanided.

Mines in Silver Bow County produced 89 per cent of the total ore, old tailings, etc., sold or treated in 1926. The dry and siliceous ore was mainly gold ore and included much gold-bearing iron ore from Broadwater County, which was used as a flux at the smelters. Copper ore, old tailings, etc., represented 71 per cent of the total output, lead-zinc ore and old tailings more than 18 per cent, copper-lead ore 5 per cent, and lead ore, slag, and old tailings 3 per cent. The quantities of first-class shipping ore and concentrates, with their recoverable contents, are given in the tables on pages 390 to 391. Copper ore and copper concentrates exceeded all other kinds. Most of the ore, whether of shipping or milling grade, was sulphide.

A review of the production of ore and metals in Montana from 1911 to 1926 shows that the output of lead and zinc has increased decidedly since the pre-war period and that the output of silver and copper has been upheld, but that the output of gold declined steadily for six years after 1915. During the 10-year period, 1917 to 1926, 58 per cent of the total yield of gold was recovered from dry and siliceous ore, 9 per cent from placers, and 22 per cent from copper ore. Most of the silver, or 56 per cent, was recovered from copper ore, 27 per cent from zinc, lead-zinc, and copper-lead-zinc ores, and 10 per cent from dry and siliceous ore. Virtually all the copper, except about 1 per cent from zinc and lead-zinc ores, was recovered from copper ore. Seventy-one per cent of the lead was derived from zinc ore, lead-zinc ore, and copper-lead-zinc ore, and nearly 24 per cent from lead ore. Zinc was recovered almost entirely from lead-zinc ore, zinc ore, and copper-lead-zinc ore.

Ore, old tailings, etc., sold or treated in Montana, 1917–1926, with content in terms of recovered metals

DRY AND SILICEOUS ORE

Year	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
1917	444, 222	107, 172. 83	954, 477	543, 456	268, 464	----------
1918	286, 522	80, 613. 50	1, 028, 443	251, 764	33, 264	----------
1919	221, 686	64, 289. 55	1, 707, 053	396, 501	140, 694	----------
1920	178, 352	45, 293. 42	2, 000, 162	358, 808	611, 004	----------
1921	164, 906	47, 377. 95	1, 546, 910	85, 468	956, 655	----------
1922	373, 311	53, 343. 24	2, 197, 802	217, 906	581, 205	----------
1923	342, 253	54, 743. 81	1, 280, 235	50, 271	42, 867	----------
1924	207, 487	63, 174. 26	947, 083	309, 015	627, 015	----------
1925	194, 691	38, 081. 43	591, 369	157, 745	368, 128	----------
1926	93, 571	23, 810. 07	345, 456	55, 266	72, 924	----------

COPPER ORE

Year	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
1917	4, 844, 537	27, 561. 56	8, 911, 389	[1]271,331,853	820	----------
1918	6, 412, 941	32, 464. 51	10, 521, 219	[1]316,740,920	----------	----------
1919	3, 081, 451	16, 612. 99	6, 341, 825	[1]165,321,847	----------	----------
1920	4, 002, 491	18, 720. 88	6, 030, 507	[1]172,581,159	1, 847	----------
1921	928, 461	4, 733. 30	1, 663, 472	[1]46,888,812	1, 029	----------
1922	3, 250, 213	13, 367. 13	5, 446, 684	[1]162,860,743	----------	----------
1923	4, 420, 601	19, 776. 67	7, 619, 864	[1]220,471,500	1, 864	----------
1924	3, 437, 931	24, 926. 12	7, 845, 180	[1]243,927,687	----------	----------
1925	3, 190, 841	32, 352. 64	8, 656, 401	[1]265,201,209	----------	----------
1926	3, 179, 051	27, 289. 67	7, 762, 190	[1]250,247,871	----------	----------

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[1] Includes copper recovered from precipitates.

Ore, old tailings, etc., sold or treated in Montana, 1917–1926, with content in terms of recovered metals—Continued

LEAD ORE

Year	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
1917	28, 923	4, 688. 65	388, 435	55, 780	5, 554, 911	
1918	31, 423	4, 747. 38	707, 757	178, 809	6, 537, 297	
1919	33, 551	3, 797. 15	747, 960	192, 927	6, 753, 703	
1920	64, 563	3, 084. 34	800, 856	199, 951	9, 583, 916	
1921	113, 481	4, 151. 98	1, 352, 125	215, 114	7, 414, 293	11, 167
1922	96, 203	2, 783. 02	647, 754	33, 275	8, 133, 697	
1923	105, 450	2, 368. 15	437, 703	184, 842	8, 741, 531	69, 560
1924	78, 656	1, 486. 37	287, 041	222, 066	7, 829, 188	
1925	118, 062	2, 393. 79	532, 219	387, 701	9, 320, 422	
1926	132, 039	2, 391. 32	514, 628	363, 825	8, 467, 354	
COPPER-LEAD ORE						
1917	3, 344	223. 45	95, 747	156, 675	1, 073, 182	
1918	253	32. 02	2, 304	10, 086	81, 775	
1919	971	90. 08	58, 335	86, 416	480, 662	
1920	1, 787	113. 83	38, 685	62, 508	375, 072	
1921	334	10. 59	26, 244	24, 388	166, 526	
1922	21, 251	659. 18	122, 153	204, 497	518, 697	
1923	106, 325	271. 05	340, 559	598, 152	1, 445, 059	
1924	160, 883	332. 74	573, 038	1, 181, 998	2, 339, 877	
1925	195, 327	2, 113. 50	555, 365	1, 382, 541	2, 576, 816	
1926	224, 322	331. 43	668, 986	1, 650, 177	3, 910, 331	
ZINC ORE, LEAD-ZINC ORE, AND COPPER-LEAD-ZINC ORE						
1917	986, 138	7, 906. 45	2, 774, 543	2, 374, 810	15, 053, 843	186, 259, 331
1918	1, 092, 828	13, 167. 83	4, 534, 590	5, 993, 271	30, 483, 539	209, 258, 148
1919	845, 935	8, 968. 63	3, 683, 699	3, 983, 597	27, 062, 705	168, 763, 823
1920	994, 422	8, 359. 88	3, 706, 758	3, 856, 834	20, 682, 077	184, 337, 786
1921	117, 619	4, 369. 18	1, 968, 371	884, 948	11, 828, 414	23, 264, 799
1922	644, 900	6, 520. 40	4, 053, 106	2, 438, 021	20, 533, 880	119, 069, 818
1923	768, 906	5, 947. 07	3, 702, 141	2, 820, 499	25, 714, 302	141, 390, 832
1924	767, 525	6, 611. 08	3, 636, 774	3, 511, 296	28, 679, 928	128, 475, 218
1925	706, 087	5, 276. 24	2, 822, 432	1, 781, 651	25, 265, 278	115, 316, 922
1926	841, 072	5, 577. 32	3, 477, 670	3, 055, 723	29, 855, 584	147, 401, 507

Ore, old tailings, etc., sold or treated in Montana, 1925–26, with content in terms of recovered metals

1925

Source	Mines producing	Ore, old tailings, etc.		Gold		Silver	
		Short tons	Per cent	Fine ounces	Per cent	Fine ounces	Per cent
Dry gold ore	98	[1] 149, 721	3. 40	34, 351. 64	41. 83	124, 431	0. 95
Dry gold and silver ore	11	[2] 1, 209	. 03	276. 45	. 34	6, 439	. 05
Dry silver ore	68	[3] 43, 761	. 99	3, 453. 34	4. 21	460, 499	3. 50
Copper ore	26	[4] 3, 190, 841	72. 44	32, 352. 64	39. 40	8, 656, 401	65. 79
Lead ore	116	[5] 118, 062	2. 68	2, 393. 79	2. 91	532, 219	4. 04
Zinc ore	1	19, 271	. 44	165. 91	. 20	133, 587	1. 02
Copper-lead ore	5	195, 327	4. 43	2, 113. 50	2. 57	555, 365	4. 22
Lead-zinc ore	40	[6] 686, 816	15. 59	5, 110. 33	6. 22	2, 688, 845	20. 43
Total, lode mines	[7] 331	4, 405, 008	100. 00	80, 217. 60	97. 68	13, 157, 786	100. 00
Total, placers	93			1, 905. 25	2. 32	405	
	424	4, 405, 008	100. 00	82, 122. 85	100. 00	13, 158, 191	100. 00

[1] Includes 10,432 tons of old tailings concentrated and 100 tons of old tailings cyanided.
[2] Includes 600 tons of old tailings cyanided.
[3] Includes 235 tons of old tailings sold to a smelter and 25,000 tons of old tailings cyanided.
[4] Includes 60,754 tons of old tailings sold to a smelter.
[5] Includes 25,000 tons of old tailings concentrated and 53,013 tons of slag sold to a smelter.
[6] Includes 1,444 tons of old tailings concentrated.
[7] A mine producing more than one class of ore is counted but once in arriving at total for all classes.

Ore, old tailings, etc., sold or treated in Montana, 1925–26, with content in terms of recovered metals—Continued

1925—Continued

Source	Copper		Lead		Zinc	
	Pounds	Per cent	Pounds	Per cent	Pounds	Per cent
Dry gold ore	128,707	0.05	260,895	0.70		
Dry gold and silver ore	2,561		4,701	.01		
Dry silver ore	26,477	.01	102,532	.27		
Copper ore	[8] 265,201,209	98.62				
Lead ore	387,701	.15	9,320,422	24.83		
Zinc ore	165,750	.06	348,871	.93	3,201,404	2.78
Copper-lead ore	1,382,541	.51	2,576,816	6.87		
Lead-zinc ore	1,615,901	.60	24,916,407	66.39	112,115,518	97.22
	268,910,847	100.00	37,530,644	100.00	115,316,922	100.00

1926

Source	Mines producing	Ore, old tailings, etc.		Gold		Silver	
		Short tons	Per cent	Fine ounces	Per cent	Fine ounces	Per cent
Dry gold ore	101	[9] 80,847	1.81	21,583.35	35.67	75,148	0.59
Dry gold and silver ore	9	1,415	.03	482.70	.80	16,389	.13
Dry silver ore	62	[10] 11,309	.25	1,744.02	2.88	253,919	1.99
Copper ore	29	[11] 3,179,051	71.12	27,289.67	45.10	7,762,190	60.79
Lead ore	112	[12] 132,039	2.95	2,391.32	3.95	514,628	4.03
Zinc ore	3	20,991	.47	161.92	.27	123,437	.96
Copper-lead ore	7	224,322	5.02	331.43	.55	668,986	5.24
Lead-zinc ore	54	[13] 820,081	18.35	5,415.40	8.95	3,354,233	26.27
Total, lode mines	[7] 335	4,470,055	100.00	59,399.81	98.17	12,768,930	100.00
Total, placers	58			1,104.30	1.83	162	
	393	4,470,055	100.00	60,504.11	100.00	12,769,092	100.00

Source	Copper		Lead		Zinc	
	Pounds	Per cent	Pounds	Per cent	Pounds	Per cent
Dry gold ore	5,653		37,740	0.09		
Dry gold and silver ore	34,919	0.01	5,640	.01		
Dry silver ore	14,694	.01	29,544	.07		
Copper ore	[14] 250,247,871	97.99				
Lead ore	363,825	.14	8,467,354	20.02		
Zinc ore	349,195	.14	245,398	.58	4,464,731	3.03
Copper-lead ore	1,650,177	.65	3,910,331	9.24		
Lead-zinc ore	2,706,528	1.06	29,610,186	69.99	142,936,776	96.97
	255,372,862	100.00	42,306,193	100.00	147,401,507	100.00

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[7] A mine producing more than one class of ore is counted but once in arriving at total for all classes

[8] Includes 4,804,364 pounds of copper recovered from precipitates.

[9] Includes 2,040 tons of old tailings cyanided.

[10] Includes 1,500 tons of old tailings cyanided and 4,230 tons of old tailings concentrated.

[11] Includes 37,938 tons of old tailings sold to a smelter, 308,807 tons of old tailings concentrated, and 7,225 tons of pond slimes.

[12] Includes 44,930 tons of slag sold to a smelter and 49,534 tons of old tailings concentrated.

[13] Includes 977 tons of old tailings concentrated.

[14] Includes 5,044,108 pounds of copper recovered from precipitates.

Value of metals from ore, old tailings, etc., sold or treated in Montana in 1926, by kinds of ore

Kind of ore	Ore, old tailings, etc. (short tons)	Gold	Silver	Copper	Lead	Zinc	Total
Dry gold ore	80, 847	$446, 168	$46, 892	$791	$3, 019	------------	$496, 870
Dry gold and silver ore	1, 415	9, 978	10, 227	4, 889	451	------------	25, 545
Dry silver ore	11, 309	36, 052	158, 445	2, 057	2, 364	------------	198, 918
Copper ore	3, 179, 051	564, 128	4, 843, 607	[1]35, 034, 702	------------	------------	40, 442, 437
Lead ore	132, 039	49, 433	321, 128	50, 936	677, 388	------------	1, 098, 885
Zinc ore	20, 991	3, 347	77, 025	48, 887	19, 632	$334, 855	483, 746
Copper-lead ore	224, 322	6, 851	417, 447	231, 025	312, 826	------------	968, 149
Lead-zinc ore	820, 081	111, 946	2, 093, 041	378, 914	2, 368, 815	10, 720, 258	15, 672, 974
	4, 470, 055	1, 227, 903	7, 967, 812	[1]35, 752, 201	3, 384, 495	11, 055, 113	59, 387, 524
Total, 1925	4, 405, 008	1, 658, 245	9, 131, 503	[2]38, 185, 340	3, 265, 166	8, 764, 086	61, 004, 340

[1] Includes value of 5,044,108 pounds of copper recovered from precipitates.
[2] Includes value of 4,804,364 pounds of copper recovered from precipitates.

GOLD ORE

Gold ore and old tailings, largely dry and siliceous, were reported from 101 mines in 1926, compared with 98 in 1925. This material, which decreased 46 per cent, yielded on the average $5.52 in gold and 0.93 ounce of silver to the ton and a little copper and lead and was valued at $6.15 in recovered metals a ton. Lewis and Clark, Park, and Broadwater Counties, in the order named, produced most of the gold ore; the Jardine mine at Jardine, Park County, was the largest producer, with the Drumlummon property at Marysville, Lewis and Clark County, following.

GOLD AND SILVER ORE

Gold and silver ore was reported from nine mines in five counties. This ore yielded on the average $7.05 in gold and 11.58 ounces of silver to the ton, 1.23 per cent of copper, and 0.20 per cent of lead. Most of the output was smelting ore from the Jib mine at Basin, Jefferson County.

SILVER ORE

A total of 62 mines made the output of siliceous silver ore and old tailings, which yielded on the average $3.19 in gold and 22.45 ounces of silver to the ton, 0.065 per cent of copper, and 0.13 per cent of lead. The output of this class of material showed a marked decrease, as a result of the large decrease in the treatment of old silver tailings from the Elkhorn dump in Jefferson County. Some of the large producers of silver ore or old tailings in 1926 were the Granite Bimetallic mine at Philipsburg, Granite County; the Elkhorn dump in Jefferson County; and the Eveline & Twilight property at Butte, Silver Bow County. The Champion mine in Deer Lodge County, a large producer of silver ore in the past, was idle throughout the year.

COPPER ORE

Copper ore, old tailings, etc., decreased slightly in quantity compared with 1925. The output, reported from 29 mines, represented 71 per cent of the State total. The average yield of the ore, etc., was 18 cents in gold and 2.44 ounces of silver to the ton and 3.86 per cent of copper, or 77.13 pounds to the ton; the average value in recovered metals a ton was $12.50, exclusive of the value of copper from mine-water precipitates. Nearly all the copper ore was mined at Butte—largely from the Anaconda, Butte & Superior, Anselmo, East Butte, North Butte, Elm Orlu, and Mountain Chief properties—and most of it was milling ore.

LEAD ORE

The output of lead ore, old tailings, and slag, reported from 112 mines, increased 12 per cent over 1925 and yielded metals valued at $1,098,885, or an average of $8.32 in recovered metals a ton. The average yield was 37 cents in gold and 3.90 ounces of silver to the ton, 0.14 per cent of copper, and 3.21 per cent of lead. Jefferson, Judith Basin, Cascade, and Beaverhead Counties yielded most of the lead ore, and the Jefferson Milling Co., Block P., Gibson slag dump, and Hecla slag dump were large producers.

COPPER-LEAD ORE

The output of copper-lead ore, which increased 15 per cent, was reported from seven mines. The average yield was 3 cents in gold and 2.98 ounces of silver to the ton, 0.37 per cent of copper, and 0.87 per cent of lead; the average value in recovered metals a ton was $4.32. Nearly all the output was mill ore from the Silver Dyke property in Cascade County. The Boston-Montana property in Beaverhead County, a large producer of copper-lead ore in the past, was idle.

ZINC ORE

Zinc ore, nearly all of which was milled at Anaconda, was produced by two mines at Butte and one mine near Toston, Broadwater County. The average yield of the ore was 16 cents in gold and 5.88 ounces of silver to the ton, 0.83 per cent of copper, 0.58 per cent of lead, and 10.63 per cent of zinc, and the average value in recovered metals a ton was $23.05.

LEAD-ZINC ORE

The output of lead-zinc ore and old tailings was reported from 54 mines, represented more than 18 per cent of the total, and increased more than 19 per cent over 1925. The average yield was 14 cents in gold and 4.09 ounces of silver to the ton, 0.17 per cent of copper, 1.81 per cent of lead, and 8.71 per cent of zinc. The average value in recovered metals a ton was $19.11. Six mines at Butte produced 94 per cent of the lead-zinc ore; all of it was milled at Butte or Anaconda. The Butte & Superior, Elm Orlu, Emma, Poser, Moulton, and Anaconda mines, at Butte, were the largest producers. Large shipments of lead-zinc ore for custom milling were made from the Mount Washington mine, near Wickes, Jefferson County, and from the Queen of the Hills property, near Neihart, Cascade County. The Timber Butte custom mill at Butte made mainly two products—a silver-lead concentrate and a silver-zinc concentrate.

Ore, old tailings, etc., sold or treated in Montana, 1925–26, by counties, with content in terms of recovered metals

1925

DRY GOLD ORE

County	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Beaverhead	226	373.26	1,063			
Broadwater	1,081	541.67	217	114		
Deer Lodge	2,864	1,542.57	438	2,067		
Fergus	129	431.67	310			
Gallatin	8	4.29	4			
Granite	483	533.21	590	162		
Jefferson	[1] 57,192	9,453.24	93,094	123,816	258,638	
Lewis and Clark	16,533	5,513.88	22,348		632	
Madison	1,511	1,618.46	4,598	2,048	1,625	
Meagher	14	26.40	4			
Mineral	170	11.96	5			
Park	69,409	14,182.46	1,511			
Powell	27	21.60	15			
Ravalli	60	19.94	5			
Silver Bow	14	77.03	229	500		
	149,721	34,351.64	124,431	128,707	260,895	

DRY GOLD AND SILVER ORE

County	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
Granite	81	56.41	2,011			
Jefferson	153	64.71	1,695	2,134		
Madison	[2] 959	146.36	2,511	427	4,701	
Phillips	15	8.72	214			
Silver Bow	1	.25	8			
	1,209	276.45	6,439	2,561	4,701	

DRY SILVER ORE

County	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
Beaverhead	[3] 298	13.23	12,197	4,470	19,872	
Cascade	242	459.39	35,031		59	
Deer Lodge	5,249	161.34	49,288			
Fergus	74	4.29	2,156			
Granite	3,616	616.69	66,380	2,870		
Jefferson	[4] 26,263	246.52	86,201	18,410	77,663	
Lewis and Clark	170	4.80	6,367		4,938	
Madison	44	28.19	2,862			
Ravalli	14	.51	439	533		
Silver Bow	7,791	1,918.38	199,578	194		
	43,761	3,453.34	460,499	26,477	102,532	

COPPER ORE

County	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
Broadwater	19	0.48	32	2,822		
Granite	542	4.68	2,716	98,367		
Jefferson	45	.33	196	4,120		
Lewis and Clark	60	1.70	658	10,651		
Madison	17,009	3,080.16	16,714	170,112		
Missoula	489	38.05	4,670	30,351		
Powell	3	.10	3	711		
Sanders	54	10.72	974	19,646		
Silver Bow	[5] 3,172,620	29,216.42	8,630,438	[6] 264,864,429		
	3,190,841	32,352.64	8,656,401	265,201,209		

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[1] Includes 100 tons of old tailings cyanided and 10,432 tons of old tailings concentrated.

[2] Includes 600 tons of old tailings cyanided.

[3] Includes 235 tons of old tailings sold to a smelter.

[4] Includes 25,000 tons of old tailings cyanided.

[5] Includes 60,754 tons of old tailings sold to a smelter.

[6] Includes 4,804,364 pounds of copper recovered from precipitates.

Ore, old tailings, etc., sold or treated in Montana, 1925–26, by counties, with content in terms of recovered metals—Continued

1925—Continued

LEAD ORE

County	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Beaverhead	[7] 31, 050	344. 58	48, 707	155, 096	2, 715, 465	
Broadwater	960	61. 50	13, 226	1, 202	376, 418	
Cascade	[8] 24, 291	41. 20	135, 789	123, 152	1, 564, 281	
Gallatin	36		14		4, 085	
Granite	2, 827	31. 60	21, 250	4, 707	173, 612	
Jefferson	[9] 26, 959	968. 99	120, 763	58, 349	777, 600	
Judith Basin	[10] 29, 273	439. 10	148, 285	5, 918	2, 836, 289	
Lewis and Clark	501	100. 10	11, 555	5, 909	244, 855	
Lincoln	29	15. 18	482		7, 686	
Madison	648	153. 35	10, 987	2, 027	343, 022	
Meagher	[11] 156		149		13, 715	
Missoula	1, 193	105. 42	14, 593	31, 070	209, 739	
Powell	113	128. 35	5, 528	34	48, 075	
Silver Bow	26	4. 42	891	237	5, 580	
	118, 062	2, 393. 79	532, 219	387, 701	9, 320, 422	

COPPER-LEAD ORE

County	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
Beaverhead	20, 247	241. 90	60, 904	136, 653	361, 310	
Cascade	167, 847	211. 17	459, 260	1, 219, 200	2, 096, 795	
Jefferson	7, 200	1, 660. 33	33, 237	24, 374	99, 158	
Sanders	33	. 10	1, 964	2, 314	19, 553	
	195, 327	2, 113. 50	555, 365	1, 382, 541	2, 576, 816	

LEAD-ZINC ORE

County	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
Cascade	909	7. 09	9, 417	106	44, 859	101, 960
Granite	1, 467	29. 89	27, 707		80, 633	203, 149
Jefferson	[12] 2, 537	198. 17	20, 241	8, 043	222, 073	396, 396
Judith Basin	19	. 13	430		3, 028	3, 315
Lewis and Clark	158	3. 27	1, 216	1, 797	35, 722	34, 964
Lincoln	12, 595	86. 34	9, 287		518, 900	336, 600
Madison	1, 530	35. 56	5, 349	108	79, 902	117, 285
Mineral	4, 835	. 40	11, 406		86, 643	280, 500
Sanders	88		228		16, 896	62, 832
Silver Bow	662, 678	4, 749. 48	2, 603, 564	1, 605, 847	23, 827, 751	110, 578, 517
	686, 816	5, 110. 33	2, 688, 845	1, 615, 901	24, 916, 407	112, 115, 518

1926

DRY GOLD ORE

County	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
Beaverhead	306	222. 60	371			
Broadwater	16, 383	2, 577. 55	452		649	
Cascade	10	31. 61	10			
Fergus	47	156. 29	319			
Granite	132	250. 31	332			
Jefferson	1, 390	1, 509. 54	3, 385	3, 942	15, 657	
Lewis and Clark	[13] 34, 914	9, 431. 92	66, 910	789	13, 968	
Madison	[14] 2, 829	1, 796. 30	2, 178	858	3, 260	
Mineral	21	5. 24	5			
Park	24, 631	5, 388. 30	631			
Phillips	6	31. 75	175			
Powell	177	174. 30	352		4, 206	
Silver Bow	1	7. 64	28	64		
	80, 847	21, 583. 35	75, 148	5, 653	37, 740	

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[7] Includes 29,308 tons of slag sold to a smelter.

[8] Includes 21,468 tons of slag sold to a smelter.

[9] Includes 25,000 tons of old tailings concentrated and 795 tons of slag sold to a smelter.

[10] Includes 1,308 tons of slag sold to a smelter.

[11] Includes 134 tons of slag sold to a smelter.

[12] Includes 1,444 tons of old tailings concentrated.

[13] Includes 1,980 tons of old tailings cyanided.

[14] Includes 60 tons of old tailings cyanided.

Ore, old tailings, etc., sold or treated in Montana, 1925–26, by counties, with content in terms of recovered metals—Continued

1926—Continued

County	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
DRY GOLD AND SILVER ORE						
Granite	142	27.44	1,131			
Jefferson	1,157	348.09	12,156	34,902	1,238	
Madison	16	4.32	188		1,032	
Powell	39	44.90	1,831		3,370	
Silver Bow	61	57.95	1,083	17		
	1,415	482.70	16,389	34,919	5,640	
DRY SILVER ORE						
Beaverhead	24	0.71	4,869	367		
Cascade	76	152.47	14,590	31	505	
Deer Lodge	124	5.86	4,474			
Fergus	79	3.72	2,037			
Granite	[15] 5,900	362.42	87,385	5,373	8,963	
Jefferson	[16] 1,906	194.02	47,660	8,207	2,216	
Lewis and Clark	262	20.60	5,648	78	17,336	
Madison	190	30.15	3,450		131	
Ravalli	39	.80	266	224	309	
Silver Bow	2,709	973.27	83,540	414	84	
	11,309	1,744.02	253,919	14,694	29,544	
COPPER ORE						
Beaverhead	77	0.81	324	27,185		
Broadwater	3	.02	1	256		
Deer Lodge	1		27	57		
Granite	94	10.59	2,277	6,338		
Jefferson	26	1.19	94	3,285		
Lewis and Clark	602	1.55	1,217	177,256		
Meagher	15		2	6,416		
Missoula	237	12.33	1,923	22,094		
Sanders	92	1.19	464	12,424		
Silver Bow	[17] 3,177,904	27,261.99	7,755,861	[18] 249,992,560		
	3,179,051	27,289.67	7,762,190	250,247,871		
LEAD ORE						
Beaverhead	[19] 19,970	102.72	27,715	107,496	1,761,748	
Broadwater	1,356	176.50	35,204	3,512	852,632	
Cascade	[20] 23,932	8.70	89,816	91,285	1,018,587	
Granite	597	10.20	16,885	771	85,206	
Jefferson	[21] 53,694	1,231.94	179,678	143,114	1,056,978	
Judith Basin	28,275	345.50	143,561	1,234	2,774,492	
Lewis and Clark	352	118.40	4,582	4,076	119,384	
Madison	576	345.01	8,381	1,093	279,921	
Meagher	[22] 2,855		2,070	5,532	413,001	
Mineral	17	1.17	172	135	9,387	
Missoula	182	15.20	2,921	4,586	29,621	
Powell	214	34.08	3,029	349	56,243	
Sanders	16	.70	585	608	8,321	
Silver Bow	3	1.20	29	34	1,833	
	132,039	2,391.32	514,628	363,825	8,467,354	

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[15] Includes 4,230 tons of old tailings concentrated.

[16] Includes 1,500 tons of old tailings cyanided.

[17] Includes 37,938 tons of old tailings sold to a smelter, 308,807 tons of old tailings concentrated, and 7,225 tons of pond slimes.

[18] Includes 5,044,108 pounds of copper recovered from precipitates.

[19] Includes 18,913 tons of slag sold to a smelter.

[20] Includes 23,366 tons of slag sold to a smelter.

[21] Includes 49,534 tons of old tailings concentrated and 239 tons of slag sold to a smelter.

[22] Includes 2,412 tons of slag sold to a smelter.

Ore, old tailings, etc., sold or treated in Montana, 1925–26, by counties, with content in terms of recovered metals—Continued

1926—Continued

COPPER-LEAD ORE

County	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Beaverhead	110	4. 18	8, 471	10, 075	45, 887	
Cascade	223, 924	256. 65	658, 589	1, 626, 389	3, 768, 237	
Jefferson	2	. 40	92	116	772	
Lewis and Clark	86	3. 10	760	7, 894	80, 419	
Ravalli	200	67. 10	1, 074	5, 703	15, 016	
	224, 322	331. 43	668, 986	1, 650, 177	3, 910, 331	

LEAD-ZINC ORE

County	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
Cascade	3, 949	35. 27	46, 932		270, 222	656, 881
Granite	4, 580	142. 36	53, 677	1, 282	215, 828	474, 953
Jefferson	[23] 8, 554	737. 53	110, 304	53, 508	887, 164	1, 096, 183
Lewis and Clark	237	5. 12	2, 085		85, 018	73, 558
Lincoln	6, 536	79. 00	7, 578	3, 156	461, 471	530, 326
Madison	1, 881	63. 51	11, 812		183, 095	150, 891
Mineral	10, 253		24, 409		371, 670	994, 167
Sanders	140		526		25, 200	105, 196
Silver Bow	783, 951	4, 352. 61	3, 096, 910	2, 648, 582	27, 110, 518	138, 854, 621
	820, 081	5, 415. 40	3, 354, 233	2, 706, 528	29, 610, 186	142, 936, 776

[23] Includes 977 tons of old tailings concentrated.

The following table gives the kind and grade of zinc material marketed in 1925 and 1926:

Zinc ore, lead-zinc ore, and zinc and lead-zinc concentrates (as marketed from Montana mines and mills) sold to smelters, 1925–26

Classification	County	Quantity (dry weight)	Gross zinc	Average assay of ore or concentrates	Recovered zinc
1925		*Short tons*	*Pounds*	*Per cent*	*Pounds*
Sulphide lead-zinc ore	Sanders	88	73, 920	42. 00	62, 832
Lead-zinc concentrates	Cascade and Silver Bow	20, 222	22, 457, 640	55. 53	20, 123, 628
Zinc concentrates	Cascade, Granite, Jefferson, Judith Basin, Lewis and Clark, Lincoln, Madison, Mineral, and Silver Bow.	104, 703	105, 826, 808	50. 54	95, 130, 462
		125, 013	128, 358, 368	51. 34	115, 316, 922
1926					
Oxidized zinc ore	Broadwater	35	17, 500	25. 00	13, 650
Sulphide lead-zinc ore	Sanders	140	123, 760	44. 20	105, 196
Zinc concentrates	Cascade, Granite, Jefferson, Lewis and Clark, Lincoln, Madison, Mineral, and Silver Bow.	120, 378	133, 133, 912	55. 30	116, 595, 804
Lead-zinc concentrates	Silver Bow	36, 816	36, 189, 798	49. 15	30, 686, 857
		157, 369	169, 464, 970	53. 84	147, 401, 507

METALLURGIC INDUSTRY

The principal methods of working Montana ores are concentrating, direct smelting, and leaching. The value of metals recovered from first-class smelting ore and ore and old tailings treated in gold and silver mills in 1926 was only about 5 per cent of the value of the State output.

Forty-one milling plants of various kinds were active in Montana in 1926, although many of them ran for short periods only. They include 11 plants using the amalgamation process, 5 using amalgamation and concentration, 4 using cyanidation, 2 using amalgamation, concentration, and cyanidation, 6 using table concentration, 5 using flotation equipment after table concentration, and 5 using straight flotation. Two copper-precipitating plants at Butte that recover copper from mine waters and one electrolytic zinc-leaching plant are also included in the total. A list of the active and idle milling plants, with their equipment, in Montana in 1925, prepared by the Bureau of Mines, may be had upon request.

Of the ore and old tailings treated at gold and silver mills, 41,195 tons of ore was treated by amalgamation, with an average recovery per ton of $3.60 in gold and 0.08 ounce of silver, and 18,665 tons of ore and 3,540 tons of old tailings were treated by cyanidation, with an average recovery per ton of $5.10 in gold and 2.77 ounces of silver. During the year 375 pounds of quicksilver was purchased—0.009 pound per ton of ore amalgamated and 0.036 pound per ounce of gold and silver bullion recovered—and 43,000 pounds of sodium cyanide was used in gold and silver mills—0.642 pound per ounce of gold and silver bullion and 1.937 pounds per ton of ore and old tailings treated. The quantity of ore and old tailings treated by these processes in 1926 decreased 44 per cent from 1925, due largely to the closing of the Jardine mill in May. The quantity of gold recovered by cyanidation decreased 3 per cent, and that recovered by amalgamation increased 5 per cent.

Concentrating mills in Montana treated 93 per cent of the total material mined or treated. The resulting concentrates, together with those from gold and silver mills, averaged $40.95 in recovered metals a ton compared with $37.83 in 1925, although the quantity of concentrates produced was nearly 10 per cent less than in 1925. The decrease in quantity was especially marked in copper concentrate, but an increase was noticeable in zinc concentrate and lead-zinc concentrate. The copper concentrate, which exceeded all others in total value of metals recovered, was the least valuable per ton.

Crude ore directly smelted in 1926 averaged $17.67 in recovered metals a ton. An increase of 1.5 per cent was recorded in the total quantity of ore smelted, especially in copper ore, but a decrease was shown in siliceous ore and lead ore. The chief product was copper ore of comparatively little value per ton.

The miscellaneous material, other than ore and old tailings milled and crude ore smelted, consisted of 90,093 tons of slag, old tailings, and pond slimes shipped for smelting and mine water precipitates. It yielded 473.42 ounces of gold, 203,936 ounces of silver, 7,241,170 pounds of copper, and 2,667,819 pounds of lead. It came chiefly from Silver Bow, Beaverhead, and Cascade Counties but is not separated by counties, as this would divulge individual production.

Mine production of metals from gold and silver mills in Montana in 1926, by counties

County	Ore and old tailings treated		Recovered in bullion				
			Amalgamation		Cyanidation		Total value
	Ore	Old tailings	Gold	Silver	Gold	Silver	
	Short tons	*Short tons*	*Fine ounces*	*Fine ounces*	*Fine ounces*	*Fine ounces*	
Beaverhead	125	----------	62.21	15	----------	----------	$1,296
Broadwater	9	----------	54.25	10	----------	----------	1,127
Cascade	10	----------	31.61	10	----------	----------	659
Granite	10	----------	6.76	----------	----------	----------	140
Jefferson	50	1,500	19.81	98	101.10	33,502	23,466
Lewis and Clark	32,771	1,980	3,063.17	2,330	5,187.94	27,832	189,387
Madison	2,204	60	738.11	126	10.00	177	15,654
Mineral	21	----------	5.24	5	----------	----------	111
Park	24,631	----------	3,062.96	458	180.28	23	67,344
Phillips	5	----------	25.15	164	----------	----------	622
Powell	24	----------	100.57	49	----------	----------	2,110
	59,860	3,540	7,169.84	3,265	5,479.32	61,534	301,916
Total, 1925	88,109	25,700	6,834.77	1,658	5,659.26	89,901	321,817

County	Concentrates and recovered metal					
	Concentrates produced	Gold	Silver	Copper	Lead	Total value of metal
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	
Lewis and Clark	164	757.70	32,179	224	13,214	$36,832
Madison	12	58.04	473	59	1,306	1,608
Park	632	2,145.06	150	----------	----------	44,436
	808	2,960.80	32,802	283	14,520	82,876
Total, 1925	5,289	8,593.27	1,537	282	1,333	78,747

Mine production of metals from concentrating mills in Montana in 1926, by counties

County	Ore and old tailings treated		Concentrates and recovered metal						
	Ore	Old tailings	Concentrates produced	Gold	Silver	Copper	Lead	Zinc	Total value of metal
	Short tons	*Short tons*	*Short tons*	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*	
Broadwater	16,335	-------	2,393	2,453.30	337	----------	----------	----------	$50,924
Cascade	227,873	-------	13,694	291.92	705,521	1,626,389	4,038,459	656,881	1,046,316
Granite	4,580	4,230	998	303.86	87,583	4,147	219,784	474,953	114,718
Jefferson	9,518	50,511	5,287	1,484.87	246,542	148,560	1,509,597	1,096,183	408,318
Judith Basin	27,857	-------	6,655	328.10	131,948	----------	2,498,386	----------	288,989
Lewis and Clark	237	-------	153	5.12	2,085	----------	85,018	73,558	13,725
Lincoln	6,536	-------	1,219	79.00	7,578	3,156	461,471	530,326	83,496
Madison	2,086	-------	362	207.13	11,922	176	183,095	150,891	37,710
Mineral	10,256	-------	1,679	1.17	24,415	----------	372,116	994,167	119,590
Powell	112	-------	28	----------	576	----------	13,718	----------	1,456
Ravalli	200	-------	75	67.10	1,074	5,703	15,016	----------	4,056
Silver Bow	3,489,845	308,807	1,308,179	29,623.77	10,535,331	232,589,482	27,354,691	143,305,702	52,685,256
	3,795,435	363,548	1,340,722	34,845.34	11,754,912	234,377,613	36,751,351	147,282,661	54,854,554
Total, 1925	3,985,073	36,876	1,479,326	45,698.15	11,991,204	248,372,719	30,875,967	115,254,090	56,081,120

Mine production of metals from Montana concentrates in 1926

BY COUNTIES

	Concentrates	Gold	Silver	Copper	Lead	Zinc	Total value of metal
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*	
Broadwater	2,393	2,453.30	337	-----	-----	-----	$50,924
Cascade	13,694	291.92	705,521	1,626,389	4,038,459	656,881	1,046,316
Granite	998	303.86	87,583	4,147	219,784	474,953	114,718
Jefferson	5,287	1,484.87	246,542	148,560	1,509,597	1,096,183	408,318
Judith Basin	6,655	328.10	131,948	-----	2,498,386	-----	288,989
Lewis and Clark	317	762.82	34,264	224	98,232	73,558	50,557
Lincoln	1,219	79.00	7,578	3,156	461,471	530,326	83,496
Madison	374	265.17	12,395	235	184,401	150,891	39,318
Mineral	1,679	1.17	24,415	-----	372,116	994,167	119,590
Park	632	2,145.06	150	-----	-----	-----	44,436
Powell	28	-----	576	-----	13,718	-----	1,456
Ravalli	75	67.10	1,074	5,703	15,016	-----	4,056
Silver Bow	1,308,179	29,623.77	10,535,331	232,589,482	27,354,691	143,305,702	52,685,256
	1,341,530	37,806.14	11,787,714	234,377,896	36,765,871	147,282,661	54,937,430
Total, 1925	1,484,615	54,291.42	11,992,741	248,373,001	30,877,300	115,254,090	56,159,867

BY KINDS OF CONCENTRATES

	Concentrates	Gold	Silver	Copper	Lead	Zinc	Total value of metal
Dry and siliceous	3,570	5,710.58	67,605	3,041	3,956	-----	$160,977
Copper	1,141,165	25,129.81	7,339,635	229,777,495	-----	-----	37,268,260
Lead	27,842	3,106.23	1,257,512	911,598	22,233,623	-----	2,755,214
Zinc	120,378	2,479.48	1,976,945	1,837,251	4,644,463	116,595,804	10,658,326
Copper-lead	11,759	297.84	634,148	1,446,302	3,783,253	-----	907,007
Lead-zinc	36,816	1,082.20	511,869	402,209	6,100,576	30,686,857	3,187,646

AVERAGE RECOVERABLE CONTENT

	Short tons	*Fine ounces per ton*	*Fine ounces per ton*	*Per cent*	*Per cent*	*Per cent*	*Value per ton*
Dry and siliceous	3,570	1.60	18.94	0.04	0.06	-----	$45.09
Copper	1,141,165	.02	6.43	10.07	-----	-----	32.66
Lead	27,842	.11	45.17	1.64	39.93	-----	98.96
Zinc	120,378	.02	16.42	.76	1.93	48.43	88.54
Copper-lead	11,759	.03	53.93	6.15	16.09	-----	77.13
Lead-zinc	36,816	.03	13.90	.55	8.29	41.68	86.58
	1,341,530	.03	8.79	8.74	1.37	5.49	40.95
Total, 1925	1,484,615	.037	8.08	8.36	1.04	3.88	37.83

Mine production of metals from Montana crude ore shipped to smelters in 1926

BY COUNTIES

	Ore	Gold	Silver	Copper	Lead	Zinc	Total value of metal
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*	
Beaverhead	1,449	268.71	19,070	46,687	393,761	-----	$55,492
Broadwater	1,433	246.52	35,310	3,768	854,506	13,650	97,042
Cascade	642	159.77	29,281	12,344	99,117	-----	31,231
Deer Lodge	125	5.86	4,501	57	-----	-----	2,938
Fergus	126	160.01	2,356	-----	-----	-----	4,778
Granite	2,625	492.70	74,104	9,617	90,213	-----	64,989
Jefferson	4,911	2,413.93	72,757	97,883	438,921	-----	144,118
Judith Basin	418	17.40	11,613	1,234	276,106	-----	29,867
Lewis and Clark	1,465	566.76	16,776	189,869	217,893	-----	66,197
Madison	1,142	1,226.01	13,311	1,716	283,038	-----	56,533
Meagher	458	-----	1,261	7,452	94,538	-----	9,393
Mineral	14	-----	166	135	8,941	-----	838
Missoula	419	27.53	4,844	26,680	29,621	-----	9,697
Phillips	1	6.60	11	-----	-----	-----	143
Powell	294	152.71	4,587	349	50,101	-----	10,076
Ravalli	39	.80	266	224	309	-----	238
Sanders	248	1.89	1,575	13,032	33,521	105,196	13,418
Silver Bow	141,770	2,723.89	420,692	13,342,749	1,917	-----	2,186,958
	157,579	8,471.09	712,481	13,753,796	2,872,503	118,846	2,783,946
Total, 1925	155,248	12,923.91	846,100	12,752,516	3,376,605	62,832	2,963,751

Mine production of metals from Montana crude ore shipped to smelters in 1926—Con.

BY KINDS OF ORE

	Ore	Gold	Silver	Copper	Lead	Zinc	Total value of metal
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*	
Dry and siliceous	9,325	5,421.33	212,630	51,942	54,448		$256,378
Copper	140,194	1,716.87	343,205	13,597,531			2,153,305
Lead	7,687	1,325.21	146,797	86,238	2,664,552		344,232
Zinc	35				1,225	13,650	1,122
Copper-lead	198	7.68	9,323	18,085	127,078		18,675
Lead-zinc	140		526		25,200	105,196	10,234

AVERAGE RECOVERABLE CONTENT

	Ore	Gold	Silver	Copper	Lead	Zinc	Total value of metal
	Short tons	*Fine ounces per ton*	*Fine ounces per ton*	*Per cent*	*Per cent*	*Per cent*	*Value per ton*
Dry and siliceous	9,325	0.58	22.80	0.28	0.29		$27.49
Copper:							
Oxidized	340	.04	5.99	5.41			19.65
Sulphide	139,854	.01	2.44	4.85			15.35
Lead:							
Oxidized	3,338	.15	14.88	.30	15.21		37.57
Sulphide	4,349	.19	22.33	.76	18.96		50.32
Zinc: Oxidized	35				1.75	19.50	32.06
Copper-lead:							
Oxidized	193	.02	47.35	4.60	32.61		95.10
Sulphide	5	.64	37.00	3.12	11.84		64.00
Lead-zinc: Sulphide	140		3.76		9.00	37.57	73.10
	157,579	.05	4.52	4.36	.91	.04	17.67
Total, 1925	155,248	.083	5.45	4.11	1.09	.02	19.09

REVIEW BY COUNTIES AND DISTRICTS

BEAVERHEAD COUNTY

The value of the mine production of metals in Beaverhead County decreased from $417,858 in 1925 to $198,585 in 1926. Most of the returns came from old slag shipped from the Hecla dump, and the largest decrease was in the output of lead from this dump. The large mill of the Boston-Montana Mining Corporation was idle throughout the year.

Argenta district.—Two placers and 13 lode mines in the Argenta district produced 1,208 tons of ore, $2,978 in gold, 5,641 ounces of silver, 36,245 pounds of copper, and 347,874 pounds of lead, valued in all at $39,402. The ore was a first-class product and yielded on the average $32.54 in metals a ton. Most of the output came from the Butte-Argenta mine, operated by the Iron Mountain Mining Co. More than 500 tons of oxidized lead ore was shipped to smelters in Utah. The Midnight and Tuscarora properties produced several cars of oxidized ore containing gold, silver, copper, and lead. Other producers were the Anaconda, Goldfinch, Old Paymaster, Goldsmith, Tilden, Yellow Bird, Copper Bell, Mauldin, and Jack Rabbit mines. A little placer gold was recovered from the Watson and other claims near Argenta.

Bald Mountain district.—A little placer gold was recovered by hydraulicking gravel at the Double Eagle claim, near Polaris.

Bannack district.—One placer and three lode mines in the Bannack district produced 232 tons of ore, $4,332 in gold, and 109 ounces of silver, valued together at $4,400. The ore had an average value of $16.91 in metals a ton. Aside from a little placer gold, the output was chiefly gold ore from the Golden Leaf and Gold Bug claims and some gold bullion recovered by amalgamation by the Paymaster Gold Mining Co. A test run was made in October on low-grade ore from the Paymaster and other claims on Grasshopper Creek, an area famous for its gold production in the past. The property has a 10-stamp mill equipped for both amalgamation and cyanidation. Conditions at the property and the history of the region were given in Mining Truth, issue of January 17, 1927.

Big Hole district.—A little placer gold was recovered from the New Discovery claim; the post office is Grant.

Blue Wing district.—One car of very rich silver ore from the New Departure property was shipped to Anaconda for smelting.

Bryant district (*Melrose*).—Several cars of copper-lead ore containing considerable silver were shipped from the Hecla property, probably through lessees, and nearly 19,000 tons of old slag, containing silver, copper, and lead, was shipped from the Hecla slag dump to East Helena by way of Melrose.

Pioneer district.—The Pioneer diggings, consisting of 1,785 acres of placer property on Pioneer Creek, were optioned during the year, but no gold output was reported, and the property was later returned to the owners.

BROADWATER COUNTY

The value of the mine production of metals in Broadwater County increased from $60,076 in 1925 to $151,670 in 1926, due to the large quantity of gold ore milled from the Keating and Ohio Keating properties and the increased shipments of lead-silver ore from the Daisy Dandy mine.

Backer district (*Canton*).—Four placers and one lode mine in the Backer district produced gold and silver valued at $3,541. The Slim Jim property near Canton contributed the usual rich gold ore, most of which was treated by amalgamation. Nearly all the placer output was recovered from the Consolidated and Confederate Gulch properties in Confederate Gulch, 22 miles north of Townsend.

Beaver district.—Six lode mines in the Beaver district produced 316 tons of ore, yielding $3,315 in gold, 15,585 ounces of silver, 2,992 pounds of copper, and 158,769 pounds of lead, valued in all at $26,160, or $82.78 in metals a ton. All the output was first-class shipping ore, chiefly sulphide lead ore from the Little Olga and East Pacific mines. The latter property was operated by the Montana-Idaho Mines Corporation. The winze from the 2,000-foot tunnel was sunk an additional 80 feet, and drifting disclosed ore of better grade than on the level above. Lead ore containing more than 80 ounces of silver to the ton was shipped from the Little Olga mine. Development was continued, and a 30-ton concentration-flotation plant was built late in the year. Several cars of siliceous gold ore were shipped from the Hyantha and Hot Cake claims, and lead ore containing considerable gold from the Satellite and Sunshine groups.

Cedar Plains district (*Radersburg*).—In the Cedar Plains district 14 lode mines produced 17,430 tons of ore, yielding $52,310 in gold, 19,108 ounces of silver, 485 pounds of copper, 691,251 pounds of lead, and 13,650 pounds of zinc, valued in all at $120,625, or $6.92 in metals a ton. Most of the output was gold-bearing iron ore from the Ohio Keating and Keating properties treated by concentration. The Keating mine was worked by the Sterling Development Co., which treated several thousand tons of low-grade dump ore and shipped iron concentrate rich in gold to East Helena. Similar material from the dump of the Ohio Keating property was also treated by the Sterling Development Co. Several hundred tons of rich silver-lead ore was shipped from the Daisy Dandy, Santa Anita, North Home, Silver True, High Up, Silver Horse, and Bulldog properties. Oxidized lead ore and one car of oxidized zinc ore were shipped from the Summit mine, operated by the Exploration Co. The property is 20 miles west of Toston, on the Northern Pacific Railroad. The Broadwater Milling Co. operated the Black Friday property and treated several hundred tons of low-grade gold ore in the 75-ton concentration plant. Two lots of siliceous gold ore were shipped from the Mighty Monarch claim, near Townsend.

Park district (*Townsend*).—Two placers and five lode mines in the Park district produced metals valued at $1,306. Small lots of bullion were shipped from the Humphrey and Wilson placers and from the Morning Glory lode, and test lots of lead ore from the Excelsior, Little Fanny, Eagle, and Mountain Divide claims were shipped to East Helena.

CARBON COUNTY

Clark Fork district.—On the banks of the Clark Fork River, a tributary of the Yellowstone River, considerable drilling was done to prospect the Combination group of placer claims. The property is owned by the Gold Black Sand Mining Co. but was leased to the Yellowstone Dredging Co.

CASCADE COUNTY

The value of the mine production of metals in Cascade County was $1,209,770, which is double that of any other county except Silver Bow, which includes the Butte district. The increase of $230,300 over 1925 was the largest in any county of the State. Except for a large quantity of old slag shipped from the smelter site near Gibson below Great Falls, the output came from the mines at or near Neihart.

The Anaconda Copper Mining Co. continued roasting, leaching, refining, and manufacturing operations at Black Eagle near Great Falls. The electrolytic zinc plant treated zinc ore and concentrate from Montana, Idaho, Utah, Washington, and Canada and made slab zinc at the rate of nearly 19,000,000 pounds a month. The extension to the zinc plant was completed and operated, and the capacity of the copper refinery was increased to 26,000,000 pounds of cathodes a month. The results are given under Silver Bow County with other notes on the company.

Giant Springs district.—More than 23,000 tons of old slag, containing considerable lead and some silver, was shipped to the lead plant at East Helena from the Gibson dump.

Montana district (*Neihart*).—Twelve lode mines in the Montana district produced 228,525 tons of ore, yielding $9,991 in gold, 734,812 ounces of silver, 1,638,733 pounds of copper, 4,137,576 pounds of lead, and 656,881 pounds of zinc, valued in all at $1,078,209, or $4.72 in metals a ton, an increase from $853,340 in 1925. The output consisted of 642 tons of first-class ore, 227,873 tons of mill ore which was reduced to 13,694 tons of concentrates, and 10 tons of gold ore treated by amalgamation. The Silver Dyke Mining Co., the largest producer, operated its 950-ton concentration-flotation plant continuously and shipped lead ore and copper-lead concentrate, with some copper concentrate, to East Helena and Anaconda, Mont., and to International, Utah. The property was the third largest silver producer in Montana in 1926 and was fourth in the production of lead. The company increased the capacity of the mill and spent nearly $56,000 in developing ore that contains malachite, pyrite, chalcopyrite, and cerussite. The property is controlled by the American Zinc-Lead & Smelting Co., but no details of operations are published. The Queen of the Hills mine at Neihart was operated by lessees, and several thousand tons of lead-zinc ore was shipped to the Timber Butte custom mill at Butte. The company is said to have in reserve more than 150,000 tons of ore averaging 6 ounces of silver to the ton, 1 per cent of lead, and 3 per cent of zinc. Several cars of similar ore were shipped from the Silver Belt property, and mill ore containing lead and zinc was also shipped from the Dakota, Fairplay, Florence, Broadwater, and Galt properties. The Big Seven property was worked by lessees and two cars of ore, rich in both gold and silver, were shipped for smelting. Small lots of silver ore were also shipped from the Commonwealth and Fitzpatrick properties. Siliceous gold ore was treated from the Alice S. Extension and Davis Diamond claims.

DEER LODGE COUNTY

The smelting and milling plants of the Anaconda Copper Mining Co. near Anaconda were active throughout the year, though not at maximum capacity. Copper ore from Butte and custom material from mines throughout the State were either concentrated at the large mill equipped to treat copper ore by concentration and flotation or directly smelted in the large copper plant, equipped with reverberatories and converters. The blast furnaces were idle, and the space formerly used for the copper-leaching plant is now utilized for the zinc mill and phosphate plant. Lead-zinc ore was also treated in a special flotation plant at Anaconda and the lead concentrate shipped to East Helena while the zinc product went to Black Eagle to be roasted and treated in the enlarged electrolytic zinc plant. The results as given by the Anaconda Copper Mining Co. are reported on following pages under Silver Bow County.

Dry Gulch district.—A little placer gold was recovered by sluicing glacial material at the Dry Gulch claims.

Georgetown district (*Southern Cross*).—Four small operators in the Georgetown district produced 93 tons of ore, yielding $27 in gold, 2,614 ounces of silver, and 57 pounds of copper, valued in all at $1,666, or $17.91 in metals a ton. Several cars of silver ore were shipped from the Cameron lode, 6 miles from Anaconda, and from shallow tunnel work at the Silver Reef claim.

Oro Fino district.—The output of the Oro Fino district consisted of one lot of silver ore containing gold shipped from the Cashier group by way of Race Track, on the Northern Pacific Railroad. The Champion mine, formerly a large producer of silver, was idle.

FERGUS COUNTY

The mines near Hilger, Giltedge, and Kendall were large producers until 1920, but the output has been greatly reduced in recent years and decreased from $11,147 in 1925 to $4,778 in 1926.

Warm Springs district (*Giltedge*).—The output of the Warm Springs district consisted of 126 tons of ore, yielding metals valued at $4,778, or $37.92 a ton. The Spotted Horse mine, a large producer in the past, produced several cars of exceptionally rich gold ore, and several cars of silver ore were shipped from the Silver Bell and Silver Queen properties. The Silver Queen mine, 9 miles south of Hilger, is developed by an open cut and has considerable 30-ounce silver ore in reserve.

GRANITE COUNTY

The value of the mine production of metals in Granite County increased from $165,695 in 1925 to $181,967 in 1926, due to increased shipments of silver ore and lead-zinc ore from the mines at Philipsburg. The largest increase was in the output of zinc. In 1922 the mines of the county produced metals valued at more than $800,000.

Alps district.—A test lot of gold ore from the Rainy Day property was treated in a small amalgamation mill, and one car of low-grade copper ore from the Gypsy claim was shipped from Bonita.

Dunkleberg district.—Two small lots of oxidized lead ore containing considerable silver were shipped from the Junior property, formerly the Gustafson, and several cars of lead-zinc ore were shipped from the Forest Rose mine to the Timber Butte mill at Butte to be treated by flotation.

First Chance district (*Garnet*).—Four placers and four lode mines in the First Chance district produced 76 tons of ore, $3,357 in gold, and 124 ounces of silver, valued together at $3,434. The ore yielded on the average $30.36 in metals a ton, and the placer output was valued at $1,127. Placer gold was recovered by sluicing operations at the Elfers, Potlatch, and other claims in Bear Gulch and on Elk Creek, near Garnet. Several cars of rich gold ore were shipped from the Fourth of July, Fairview, Irene, and Gold Center claims.

Flint Creek district (*Philipsburg*).—Twelve lode mines in the Flint Creek district produced 10,859 tons of ore and old tailings, yielding $9,819 in gold, 149,378 ounces of silver, 5,797 pounds of copper, 268,539 pounds of lead, and 446,542 pounds of zinc, valued in all at $158,816, or $14.63 in metals a ton. Most of the output was that of the Trout Mining Co., which shipped first-class silver ore for smelting and low-grade lead-zinc ore for treatment by flotation at the Timber Butte mill at Butte. The company operated the Coyle and Trout groups as well as the Algonquin and Cliff claims of the Philipsburg Mining Co. Considerable manganese ore was shipped east, and lessees mined first-class silver ore, oxidized lead ore, and mixed ore of milling grade. Similar ore for smelting and milling was shipped from the Granite Bimetallic property, formerly the largest producer of silver in the district. The old tailings dump of the Granite Bimetallic Consolidated Mining Co., near Philipsburg, was leased late in the year and worked by the Jefferson Milling Co., which erected a flotation plant for the treatment of this material that contains chiefly silver minerals. The Moorlight Mining Co., operating the Headlight, Midnight, Horseshoe, and Huffman claims, produced no silver ore in 1926, but treated a large quantity of manganese ore in electric separators. The product was shipped east to be used in storage batteries. The company was reported to have paid $39,000 in dividends. Other lots of smelting ore or low-grade milling ore were shipped from the Silver Manganese, Frisco, Hobo, Mullen, Old Chief, Scratchall, and Thomas McKay claims.

Henderson district.—The Combination property, which has been closed on account of litigation, produced two cars of sulphide copper ore containing considerable silver.

Maxville district.—About 200 tons of siliceous silver ore containing some gold was shipped from the Londonderry mine, owned by the Maxville Gold & Silver Mining & Development Co. A large body of ore containing silver, gold, lead, and zinc was opened, and a contract for a 100-ton flotation mill was let in November.

Rock Creek district.—In Basin Gulch, a tributary of Rock Creek, the Basin Placer produced gold bullion which was sent to the Denver Mint.

South Boulder district (*Maxville*).—One car of exceptionally rich gold ore was shipped by lessees from the Royal Gold property and one car of low-grade silver ore from the Brooklyn claim.

JEFFERSON COUNTY

The value of the mine production of metals in Jefferson County was $578,195 in 1926, as compared with $696,313 in 1925. The large decrease in gold from the Jib mine more than offset the large increases in lead and zinc. The most valuable production in the county was that of the Mount Washington mine, operated by the Elm Orlu Mining Co.

Amazon district.—A little sulphide lead ore was shipped from the Wilbur Silver and Bismark claims, and a test lot of lead-zinc ore for milling from the Robert Emmet property.

Big Blackfoot district.—One car of silver-lead ore from the Lost Cabin property was shipped for smelting.

Bigfoot district.—The Big Four mine on State Creek, halfway between Boulder and Whitehall, produced several hundred tons of lead-zinc ore that was treated in a custom plant at Butte. The property was under option to the Elm Orlu Mining Co., but the lease was given up July 1. The State property in the same region produced a little ore containing gold and silver.

Boulder district.—Four lode mines in the Boulder district produced 1,042 tons of ore and old slag, yielding $1,145 in gold, 14,168 ounces of silver, 16,213 pounds of copper, 68,709 pounds of lead, and 21,746 pounds of zinc, valued in all at $19,384, or $18.60 in metals a ton. Lessees operating the Baltimore mine shipped several hundred tons of silver ore and sulphide lead ore for smelting as well as about 10 cars of lead-zinc ore for custom milling. The Martin Mining Co. did a little development work on the Shiels & Ironside property, and two cars of low-grade silver ore containing copper were shipped for smelting. A small test lot of oxidized copper ore was shipped from the Copper Ore claim, 3 miles north of Boulder.

Cataract district (*Basin*).—One placer and 14 lode mines in the Cataract district produced 6,480 tons of ore and old tailings, $45,282 in gold, 59,276 ounces of silver, 81,905 pounds of copper, 384,925 pounds of lead, and 319,083 pounds of zinc, valued in all at $148,462. The ore and old tailings yielded on the average $22.83 in metals a ton. The output consisted of 2,815 tons of first-class ore and 2,688 tons of concentrating ore which, with 977 tons of old tailings, was reduced to 640 tons of concentrates. As in 1923, 1924, and 1925, the largest producer was the Jib property at Basin, from which several lessees shipped more than 2,000 tons of siliceous gold ore, gold and silver ore, and lead ore. The company treated nearly 2,000 tons of lead ore in a 300-ton concentration-flotation plant before January 20, when it was closed. The property, consisting of the Katie, Hope, and Lot 7 claims, all within a radius of 3,000 feet, is opened by two vertical shafts 500 feet and 200 feet deep and an inclined shaft 600 feet deep. The mine was operated by Brown & Melcher, trustees for the creditors of the Jib Consolidated Mining Co., but the ore, containing chiefly galena and chalcopyrite, was rather low grade and it was necessary for the lessees to do selective mining. Several properties near Basin, such as the Jennie B., Crystal, and Vergenia claims, produced lead-zinc ore that was treated at the custom plant at Butte. Old lead-zinc tailings from the Comet dump, containing nearly 5 per cent of lead and 10 per cent of zinc, were also treated at Butte. First-class ore was shipped from the Alexandria, West Rumley, Buckeye, Crystal, Louise, Mantle, Morning Glory, and Garfield claims. Placer gravel at the Winter Placer claim, on Basin Creek, was treated by hydraulicking and a little bullion shipped to the Denver Mint.

Colorado district (*Wickes*).—Nine lode mines in the Colorado district produced 55,882 tons of ore, slag, and old tailings, yielding $26,243 in gold, 237,656 ounces of silver, 138,180 pounds of copper, 1,325,420 pounds of lead, and 741,984 pounds of zinc, valued in all at $355,568, or $6.36 in metals a ton. The output included 50 tons of old slag and 234 tons of crude ore smelted, as well as 49,534 tons of old tailings and 6,064 tons of mill ore reduced to 4,560 tons of concentrates. More than 3,000 tons of silver-lead concentrate was shipped by the Jefferson Milling Co., which operated a 200-ton flotation plant from February 15 to December 12 on tailings from the old Alta mill, near Corbin. The Mount Washington mine was operated the entire year by the Elm Orlu Mining Co. of Butte, which shipped three cars of lead ore for smelting and several thousand tons of lead-zinc ore for treatment at the custom plant at Butte. The mine is opened by a vertical shaft 900 feet deep, and about 1,100 feet of development work was done in drifts, raises, and crosscuts in 1926. Other occasional shipments were made from the Blizzard, Custer, Silver Tip, White Fawn, and Partner claims.

Elkhorn district.—Four lode mines in the Elkhorn district produced 2,343 tons of ore, old tailings, and slag, yielding $4,252 in gold, 35,207 ounces of silver, 2,425 pounds of copper, 10,594 pounds of lead, and 419 pounds of zinc, valued in all at $27,438, or $11.71 in metals a ton. The output consisted of 652 tons of first-class ore and 163 tons of slag smelted, 28 tons of concentrating ore, and 1,500 tons of old tailings treated by cyanidation. Cyanide precipitates containing chiefly silver were shipped by the Western Metallurgical Co., which treated old tailings of the Elkhorn dump. Operations, however, ceased the last day of the year. Several hundred tons of iron ore containing gold and a little silver was shipped from the Golden Curry mine. The property was operated a short time by the Elk Tip Mining Co., which milled a little oxidized iron ore containing about 36 per cent of iron. Test lots of silver ore and lead-zinc ore were shipped from the Elkhorn property. Several cars of slag containing about 3 per cent of lead were shipped from the old smelter dump near Queen Siding, on the Northern Pacific Railroad.

Elk Park district.—A car of low-grade silver ore from the Butte Elk Park property, controlled by the Ardsley Butte Mining Corporation, was shipped for smelting, and the company did some prospecting work early in 1927. Work was also started by the Butte Copper Consolidated Mines at the Silent Treasure property.

Homestake district.—Development work was in progress at the Evening Star mine, which produced one car of smelting ore containing considerable gold and silver.

Lump Gulch district (*Clancey*).—The output of the Lump Gulch district consisted of small lots of silver ore and lead ore from the Little Minnie, No. 96, and Sandman claims.

McClellan Creek district.—A little gold was recovered by sluicing at the Oxide placer, on Prickley Pear Creek, and two lots of gold ore were shipped from the Liza and Brooklyn claims.

Whitehall district.—Nine lode mines in the Whitehall district produced 473 tons of ore, yielding $3,586 in gold, 2,863 ounces of silver, 5,915 pounds of copper, and 135,798 pounds of lead, valued in all at $17,064, or $36.08 in metals a ton. Several cars of gold ore containing considerable silver and lead were shipped from the Sunny Corner property, and first-class lead ore was shipped from the Carbonate, Midnight, Parrot, Perhaps, Whitehall, and Minerva claims. The Craig property produced one car of copper ore.

Woodland Park district.—One car of rich gold ore was shipped from the Deer Horn claim as the result of 200 feet of prospecting work. The ore was hauled 30 miles to Corbin, on the Great Northern Railroad.

JUDITH BASIN COUNTY

Barker district (*Hughesville*).—Five lode mines in the Barker district produced 28,275 tons of ore, which yielded $7,142 in gold, 143,561 ounces of silver, 1,234 pounds of copper, and 2,774,492 pounds of lead, valued in all at $318,856, or $11.28 in metals a ton. The production consisted of 418 tons of first-class lead ore smelted and 27,857 tons of mill ore that yielded 6,655 tons of lead concentrates. Most of the output, as in recent years, was made by the Block P. Mining Co., working the Wright & Edwards property, at Hughesville. The company operated a 100-ton concentration mill most of the year and shipped more than 6,000 tons of silver-lead concentrate, as well as a little crude ore. Two products were made—a high-grade lead concentrate and an iron-lead middling, both of which were shipped to East Helena for smelting. The company ranked sixth in order of lead producers in Montana in 1926. No details regarding the ore reserves or development work for 1926 have been reported. Several cars of first-class lead ore, containing about 15 per cent of iron and 12 per cent of zinc, as well as silver and lead, were shipped from the New Liberty property, and small lots of lead ore were also shipped from the Dr. Kallock, Frenchman, and August No. 2 claims.

Yogo district.—A small sample of gold was recovered by sluicing work at the Fourth of July claim on Yogo Creek.

LEWIS AND CLARK COUNTY

The value of the mine production of metals in Lewis and Clark County in 1926 was $307,563, or 70 per cent more than in 1925. This large increase was due chiefly to the quantity of gold ore treated by amalgamation and concentration at the plant of the New Gould Mining Co. Lewis and Clark County was the only county in the State to record an increase in the output of each metal.

Regular smelting operations were continued at the lead plant of the American Smelting & Refining Co. at East Helena, which is equipped with four blast furnaces. About 6,100 tons of bullion a month was shipped east for refining. Custom material chiefly from Montana and Idaho was treated; a large part was sulphide lead ore and concentrate from the Coeur d'Alene region of Idaho. Residues from the zinc plant at Black Eagle saved from ore from various Western States constituted a large part of the receipts. The large slag pile at East Helena, which contains more than 12 per cent of zinc, was purchased by the Anaconda Copper Mining Co. for further treatment, possibly in its electrolytic zinc plant.

Bald Butte district (*Marysville*).—A little bullion was recovered from gold ore amalgamated at the Bald Butte and Dustin-Parker claims, but little work was done in the Bald Butte district, as the old producers were idle.

Dry Gulch district.—The value of the gold and silver recovered in the Dry Gulch district was only $491; practically all of this was recovered by drifting and sluicing at the Jim Town placer in Kingsbury Gulch.

Gould district.—One of the most important operations in Lewis and Clark County was that of the New Gould Mining Co., which treated more than 12,000 tons of gold ore in a 40-ton mill equipped for amalgamation and concentration. Bullion containing gold and silver was shipped to the assay office at Helena, and concentrate containing considerable silver went to the East Helena smelter. The property is opened by a shaft and an adit, and 1,400 feet of drifting was done during the year.

Grass Valley district.—Four lode claims in the Grass Valley district produced 100 tons of ore, which yielded $79 in gold, 4,805 ounces of silver, 78 pounds of copper, and 5,351 pounds of lead, valued in all at $3,516, or $35.16 in metals a ton. The Silver Coin property produced three cars of silver ore of smelting grade, and small lots of silver ore were also shipped from the Santa Claus, Carbon Hill, and Silver Bell claims.

Greenhorn district.—The Bessie (Lyle) property produced several cars of silver ore containing gold and lead, and a small lot of gold ore was treated by amalgamation at the Umatilla property, an old producer equipped with a 10-stamp mill.

Heddleston district.—The Mike Horse mine of the Sterling Mining & Milling Co. was operated a short time by lessees. First-class lead ore was shipped to East Helena and several hundred tons of lead-zinc ore to Butte for treatment by flotation. The concentration plant at the property was idle.

Helena district.—A little ore containing gold, silver, and lead was shipped to East Helena from the Alice claim.

Lincoln district.—Placer gold was recovered from the Bloom & Old Billy Williams property 6 miles south of Lincoln and from the Harvey placer in Sauerkraut Gulch.

Ottawa district (Marysville).—One placer and 10 lode mines in the Ottawa district produced 22,321 tons of ore and old tailings, $123,290 in gold, 36,367 ounces of silver, 11,185 pounds of copper, and 177,505 pounds of lead, valued in all at $161,749. The ore and old tailings yielded on the average $7.24 in metals a ton. The output increased considerably, especially that of lead. With the exception of 451 tons of smelting ore, all the output was treated in gold and silver mills, mostly by cyanidation. The largest part of the district output was gold and silver from the Drumlummon mine, operated by the St. Louis Mining & Milling Co. of Montana. Considerable bullion was saved through the operation of a 100-ton cyanidation plant that was active throughout the year. The company has about 10,000 tons of low-grade ore in reserve, but no development work was done, and the mill heads consist of ore from old pillars and old material remaining in the drifts. Old tailings from the Drumlummon dump, under lease, were also treated by cyanidation, and the company reported that several thousand tons of $8 gold ore has been blocked out in the Bluebird property, 2 miles west of Marysville, which is under development. More than 800 feet of drifting was done at the Gleason mine, and ore containing principally gold was treated by amalgamation and concentration. Several cars of oxidized silver-lead ore were shipped from the Big Ox property and a little copper-lead ore from the Home and Shockapee mines. Gold bullion was cleaned up at the Piegan-Gloster property, an old producer, and some old tailings treated by cyanidation at the Eck plant. Lessees shipped rich gold ore of smelting grade from the Cruse & Bald Mountain group, and some ore was also treated locally by cyanidation in the St. Louis mill. A little placer gold was recovered from the Sanburn claim in Uncle Ben Gulch, part of which in the form of nuggets is sold for jewelry.

Scratch Gravel district.—A small car of lead ore containing gold and silver was shipped from the Morning Star property for smelting, and also samples from the Humboldt and Kitty claims.

Stemple district.—A small sample lot of gold ore was shipped from the Marcheta prospect.

Unionville district.—Four lode mines in the Unionville district produced 159 tons of ore, yielding $2,837 in gold, 83 ounces of silver, and 565 pounds of copper, valued in all at $2,968, or $18.67 in metals a ton. One car of first-class gold ore was shipped from the Whitlatch group and a small lot from the Court House Lodge claim; a little bullion was recovered in the Whitlatch mill from ore produced at the Twilight and Whitlatch properties.

Vaughn district (Rimini).—Four lode mines in the Vaughn district produced 40 tons of ore, yielding $194 in gold, 1,003 ounces of silver, 242 pounds of copper, 15,885 pounds of lead, and 6,134 pounds of zinc, valued in all at $2,585, or $64.63 in metals a ton. Most of the output was that of the Latham or Stanton property, at Rimini, which was worked by lessees. One car of silver-lead ore was shipped for smelting, and one car of lead-zinc ore was shipped to Butte for milling. Small lots of lead ore were also shipped from the Black Bear and Lee Mountain claims, and one small lot of copper-lead-silver ore was shipped from the Helena property. The 300-ton mill at the Porphyry Dike mine was idle, but about $25,000 was spent in testing new ground with a Keystone drill. The company reports reserves of millions of tons of low-grade ore containing $1.85 to the ton in gold, which would require an unusually large milling plant.

Wolf Creek district.—Development at the New Era property was continued by the Montana Copper & Zinc Co., and several hundred tons of sulphide copper ore was shipped to Anaconda for smelting. The Honeycomb claim also produced one lot of first-class copper ore.

LINCOLN COUNTY

The value of the mine production of metals in Lincoln County increased from $80,274 in 1925 to $83,496 in 1926 as a result of the increase in the output of zinc.

Libby district.—The Lukens Hazel mine was idle. Some prospecting work was done by the Mountain Rose Mining Co. Zonolite, a variety of mica, was marketed from this region.

Troy or Callahan Creek district.—The Snow Storm Silver-Lead Co., operating property north of Troy, on the Great Northern Railroad, ran its 500-ton concentration-flotation plant as a custom mill. Several thousand tons of lead-zinc ore from the Snow Storm mine, however, was milled, the resulting lead concentrate being shipped to East Helena and the zinc product to Portland, Oreg., for export to Belgium. The mine is opened by various tunnels and drifts and a shaft 600 feet deep. About 3,000 feet of drifting was done during the year. No large ore reserves were reported. The Big Eight mine produced about 3,000 tons of lead-zinc ore that was treated at the Snow Storm custom mill. The Liberty Metals Co. did 680 feet of tunneling and opened ore containing silver, lead, and zinc.

MADISON COUNTY

The value of the mine production of metals in Madison County decreased from $216,609 in 1925 to $116,767 in 1926, due to the idleness of the mill at the Liberty-Montana mine south of Jefferson Island. In 1925 several hundred tons of copper concentrate containing a large quantity of gold was shipped from this property.

Alder Gulch district (*Virginia City*).—Two placers and seven lode mines in the Alder Gulch district produced 374 tons of ore, $3,963 in gold, and 3,114 ounces of silver, valued together at $5,906. Gold and silver from placers were valued at $957, and the ore, which yielded on the average $13.23 in metals a ton, consisted of 158 tons shipped for smelting and 216 tons treated in gold and silver mills. Several cars of silver ore from the Black Eagle and Native Silver groups of the Barton Gulch Mining Co. were shipped to Anaconda for smelting. The old workings were cleaned out, machinery installed, and a 2-mile road constructed to the main workings of both mines. A large expenditure was made at the High Up property for development work by the Soco (Inc.). A little gold ore was treated by amalgamation and concentration, and a new 75-ton plant equipped for amalgamation, cyanidation, and concentration was installed. A little gold ore was treated by amalgamation at the Elsie property, and one car of silver ore containing gold was shipped from the U. S.

Grant mine for smelting. Placer gold was recovered from the Eggert property and other placer claims in Alder Gulch, but the total was insignificant when compared with the output from dredge operations in past years.

Bone Basin district.—The M. & I. Mining Co. operated the Florence mine near Renova and shipped several cars of sulphide lead ore containing gold and silver.

Camp Creek district.—The Calvin or Avonca property near Melrose produced several cars of oxidized lead ore. Considerable first-class ore was shipped from the property when it was operated under lease, but the lease was later relinquished.

Lower Hot Springs district (Norris).—Seven lode mines in the Lower Hot Springs district produced small lots of ore yielding $2,454 in gold, 312 ounces of silver, and 159 pounds of lead, valued in all at $2,662, or $70.05 in metals a ton. The greater part of the output was rich gold ore from the Josephine mine, part of which was shipped for smelting and the remainder was treated by amalgamation. Test lots of silver ore were shipped from the Morning Star and Silver Queen claims and gold ore from the Gold Band, Birdie, Eagle Point, and East Pacific claims.

McCarthy Mountains district.—From the Hidden Treasure mine, near Reichle, three small lots of rich gold ore were shipped for smelting. Some of it assayed 13 ounces of gold to the ton, but the expense of development work was far more than the receipts from bullion. The ore was hauled 9 miles to Glen, a loading station on the Oregon Short Line Railroad. A little ore was shipped from the B. B. & I. E. claim, and the shaft was sunk to a depth of 100 feet.

Mayflower district.—One small lot of gold ore from the Mayflower property and a test lot of siliceous silver ore from the Annie Laurie mine were shipped to the smelter by way of Piedmont, on the Chicago, Milwaukee & St. Paul Railroad.

Mineral Hill district.—Five lode mines in the Mineral Hill district produced 64 tons of ore, yielding $1,514 in gold, 221 ounces of silver, 23 pounds of copper, and 2,656 pounds of lead, valued in all at $1,868, or $29.19 in metals a ton. One car of rich gold ore was shipped from the Oregon mine, near Pony, one lot of gold and silver ore from the Golden Chant property, and small test lots of ore from the Union and Mears claims. The Liberty-Montana Mines Co., owning the Mammoth mine, made no shipments, but $52,000 was expended in development work, and new trucks were purchased to haul concentrate from the mill installed in 1925.

Norwegian district.—Gold and silver produced in the Norwegian district was valued at $2,704. Most of the output was placer gold recovered at the Norwegian property by the Parish Mining Co. One car of iron ore containing a little gold and silver was shipped from the Nabob claim.

Potosi district.—A small lot of gold ore from the Granite Mountain property, near Pony, was treated by amalgamation.

Rabbit district.—The output of the Rabbit district decreased decidedly and consisted of only one lot of gold ore containing silver and lead from the King property.

Ramshorn district.—A little gold was recovered from placer claims in Bivens Gulch, and a test lot of gold concentrate from the Searchlight property, where a small mill was installed, was shipped to Anaconda for smelting.

Red Mountain district.—At the Lucky Strike claim, 12 miles east of Melrose, gold was recovered by hydraulicking material eroded from granite.

Sheridan district.—Eleven lode mines in the Sheridan district produced 3,936 tons of ore, which yielded $15,172 in gold, 12,997 ounces of silver, 499 pounds of copper, 207,513 pounds of lead, and 150,891 pounds of zinc, valued in all at $51,270, or $13.03 in metals a ton. The output consisted of 1,715 tons of ore treated in gold and silver mills, 145 tons shipped to smelters, and 2,076 tons of mill ore reduced to 360 tons of concentrates. The largest producer was the Buckeye mine, under lease, from which considerable lead-zinc ore was shipped to the Timber Butte mill at Butte during the first three months of the year. More than $8,000 worth of gold bullion from the Tamarack property was shipped to the assay office at Helena. A small mill equipped for amalgamation and concentration ran part of the year and also produced a small lot of rich gold concentrate. At the Gladstone property ore was concentrated and rich gold concentrate shipped to Anaconda. Other shipments of lead ore, gold ore, or siliceous silver ore were made from the Diadem, Bullion, Emma B., Fairview, Latest Out, and Snowslide properties. The Emma B. mine was operated by the Smuggler Mining Co., which reported a large quantity of gold ore of milling grade, for which a milling plant is needed.

Silver Star district.—A 5-ton Chilean mill equipped for amalgamation ran a short time on ore from the Strawn claim, and sinking, drifting, and surface work were carried on in the mine about nine months. One car of gold ore was shipped from the Edgerton mine, which was under lease.

Summit district (*Virginia City*).—Three lode mines in the Summit district produced 299 tons of ore and old tailings, yielding $3,732 in gold, 613 ounces of silver, 59 pounds of copper, and 1,306 pounds of lead, valued in all at $4,227, or $14.14 in metals a ton. At the Mountain Flower property a little gold ore and old tailings were treated in the 30-ton mill, the ore being amalgamated and the tailings treated by cyanidation. The property is reported to have 10,000 tons of gold ore in reserve but was worked only a few months. The Madison Mining Co. worked the Winnetka property and recovered some gold bullion, which was shipped to Helena, and a small lot of gold concentrate, shipped for smelting.

Tidal Wave district (*Twin Bridges*).—Fourteen lode mines in the Tidal Wave district produced 242 tons of crude smelting ore, which yielded $6,436 in gold, 2,087 ounces of silver, 40 pounds of copper, and 107,612 pounds of lead, valued in all at $16,353, or $67.57 in metals a ton. One car of rich gold ore was shipped from the Corncracker mine and a small lot of similar material from the High Ridge Fraction. Oxidized silver-lead ore was shipped from the Ella, Bay State & Empire State, Keynote, and Robin claims, and two cars of sulphide material from the Dutchland property. The Mohave Mining Co., operating the B. & H. and Pete & Joe groups near Twin Bridges, shipped one car of rich gold ore and did an unusual amount of development work. About 3,000 feet of drifting was done on ore bodies opened by three tunnels and a shaft. The property is said to have 250,000 tons of developed ore containing gold and silver, and a

600-ton concentration-cyanidation plant was under construction. Small lots of ore were also shipped from the Robinson Crusoe, Shoemaker, Nightingale, Texas, Agnes, and Woodpecker properties.

Upper Hot Springs district (*Norris*).—A small lot of rich gold ore was shipped from the Blue Grouse claim, 3 miles from Norris.

Washington district.—The output of the Washington district consisted of two lots of rich gold ore containing silver and lead from the Lehigh and High Bluff claims.

MEAGHER COUNTY

Beaver Creek district.—A little placer gold was recovered from stream gravel at the Klondyke placer on Beaver Creek, 7 miles northwest of Watson.

Castle Mountain district.—Five lode mines in the Castle Mountain district produced 2,855 tons of ore and old slag, yielding 2,070 ounces of silver, 5,532 pounds of copper, and 413,001 pounds of lead, valued in all at $35,107, or $12.30 in metals a ton. The output consisted of 443 tons of first-class ore and 2,412 tons of slag resmelted. Material shipped from the Lennep slag dump contained most of the lead, but lead ore and slag were also shipped from the Cumberland property. The Castle Mountain, Jumbo, and Yellowstone claims produced a few cars of sulphide lead ore.

Musselshell district.—The Capp Hill property was operated a short time and one car of sulphide copper ore shipped from surface workings.

MINERAL COUNTY

The value of the mine production of metals in Mineral County increased from $41,412 in 1925 to $122,416 in 1926, chiefly because of the large quantity of lead-zinc ore milled at the plant of the Iron Mountain Mining Co. 4 miles north of Superior.

Cedar Creek district (*Iron Mountain, Quartz*).—Nine placers and one lode mine in the Cedar Creek district produced gold, silver, and a little lead, valued at $1,939. Most of the output was gold recovered from placers in the vicinity of Quartz, Iron Mountain, and Superior, where several large companies were doing testing. The gold is exceptionally pure, some of it having a fineness of 0.985. It was produced chiefly from the Eddy, McFarlane, Mildred, Stockholm, Stemwinder, Windfall, and Henrietta claims. The American Gold Mining Co. did only assessment work, but a little testing was done on the concentration of lead ore containing gold and silver.

Iron Mountain district (*Superior, Iron Mountain*).—Three lode mines in the Iron Mountain district produced 10,145 tons of ore, yielding 24,291 ounces of silver, 135 pounds of copper, 367,261 pounds of lead, and 962,269 pounds of zinc, valued in all at $116,728, or $11.51 in metals a ton. Nearly all the output was lead-zinc ore from the Iron Mountain mine north of Superior, owned by the Federal Mining & Smelting Co., but operated by the Iron Mountain Mining Co. More than 10,000 tons of lead-zinc ore was treated in the 150-ton flotation plant, the lead concentrate being smelted at East Helena and the zinc product shipped to Portland, Oreg., for export. The mill was rebuilt and improved in 1925, and the company is reported to have in reserve 100,000 tons of ore containing silver, lead, and zinc, chiefly as galena and sphalerite. The Federal

Mining & Smelting Co. received $7,368 as royalty and reports that the lead concentrate contained 17,820 ounces of silver and 374,000 pounds of lead. The zinc concentrate contained 7,802 ounces of silver and 1,122,000 pounds of zinc. A little lead-zinc ore for testing was shipped from the Nite Owl claim, and one car of first-class lead ore was shipped from the Darby property.

St. Regis district.—Development work was in progress at the Lenora property, 8 miles from St. Regis, and a little gold ore was treated in a 20-ton amalgamation mill. About 1,800 feet of crosscutting and drifting was done at the Amazon Dixie mine and general development at the Richmond-Lexington property.

Saltese district.—The Silver Cable mine, 5 miles north of Taft, was not extensively worked, but while under lease several cars of lead-zinc ore were shipped to Butte for treatment by flotation. At the Tarbox mine 1,000 feet of development was done.

MISSOULA COUNTY

The value of the mine production of metals in Missoula County decreased to $9,860, as a result of the large decrease in the shipments of ore from the Hidden Treasure mine near Clinton.

Ninemile district.—A small quantity of exceptionally fine placer gold was recovered from claims on Pine Creek, Petty Creek, and McCornick Creek.

Wallace district.—Three cars of oxidized copper ore were shipped from the Kennebeck property 3 miles east of Clinton, and several hundred tons of oxidized copper ore and lead ore were shipped from the Hidden Treasure property, a large producer in 1925.

PARK COUNTY

The value of the mine production of gold and silver in Park County decreased from $294,248 in 1925 to $111,780 in 1926 as a result of decreased shipments of bullion and calcines from the Jardine mine 6 miles northeast of Gardiner. The mill on the property was closed in May on account of the decreased price of arsenic.

Crevasse district.—Gold bullion was recovered by amalgamation at the George B. property. In the early nineties the district was a large producer of gold. A report on the geology and ore occurrence is being prepared by the United States Geological Survey.

New World district.—Development was reported at the Western Smelting, O. K., and Little Daisy mines, but no ore was shipped from the district.

Sheepeater district (*Jardine*).—The Jardine Mining Co. operated its mine and mill five months, producing bullion containing gold and silver and rich gold-bearing calcines shipped for smelting. The property is equipped with a 40-stamp mill using amalgamation and concentration, as well as an arsenic plant and a small cyanidation plant. A large quantity of arsenic, produced during the early part of the year as a result of roasting ore that is chiefly arsenopyrite containing gold, was marketed, but the price of arsenic decreased to such an extent that 100 men were laid off and the mill was closed in May. During the first five months of the year more than 24,000 tons of ore, which had a gross value of $150,076 was milled, and

$133,135 was received for bullion, calcines, and arsenic, aside from $12,350 in products on hand. Costs included $145,002 for mining, milling, and "general expenses." A dividend of $10,899 was paid in 1926. Although the mine was the second largest producer of gold in Montana in 1926, the output was much less than in 1925. The company's annual printed report for 1926 says:

> The low price of arsenic, coupled with inability to market it promptly, decided the directors to suspend operations in May. * * *
>
> At that time refined white arsenic, the Jardine product, had declined to 3 cents a pound in carload lots f. o. b. New York, with no market for it. * * *
>
> While ore of high grade is frequently encountered, the average as mined and milled is low; * * * but in the past large bodies of high-grade ore have been found, and it is reasonable to expect that more high-grade ore bodies will be uncovered by future development.
>
> Fortunately mining conditions are favorable, resulting in low costs. No work has been done below the main haulage tunnels, which are on the level of the bins of the 40-stamp mill, so that no pumping or hoisting is required. The mine is developed through 25 crosscut tunnels, with about 7 miles of workings, and all the ore is dropped through chutes to haulage levels or trammed directly to a gravity tram handling ore from the North end workings. * * *
>
> Although the property has been worked for many years, only a small portion of the area owned by the company has been developed. * * *
>
> * * * The placer ground owned by the company extends from the mine down Bear Creek for 3 miles, to Yellowstone River. * * *
>
> The average gross value of gold and arsenic recovered from the ore mined has been $6.38 a ton, of which $4.07 was gold and $2.31 arsenic. * * *
>
> In 1926 there were milled 24,586 tons of ore; the total milled from 1922 until 1926 was 223,445 tons. Briefly, the process used is plate amalgamation, classification, table concentration, regrinding, flotation, roasting of concentrates for production of white arsenic, shipping gold calcines to smelters for treatment; and recently regrinding and cyaniding calcines at Jardine for the extraction of gold instead of shipping to the smelters. The average assay recovery was 80 per cent of the gold and 74.3 per cent of the arsenic. * * *
>
> A cyanide plant to extract the gold from the concentrates after roasting out the arsenic was put in operation early in the year and worked successfully.

PHILLIPS COUNTY

Little Rockies district.—Aside from prospecting, the mines of the Little Rockies district were idle, but a little bullion containing gold and silver was cleaned up from the old machinery of the Beaver Creek Mining Co. near Zortman.

POWELL COUNTY

The mine production of metals in Powell County was valued at $19,420 in 1926, an increase of $1,647 over 1925, chiefly in the output of gold.

Big Blackfoot district.—Placer bullion produced by sluicing and hydraulicking at the Gold Dust property near Helmville was shipped.

Blossburg district.—A small sample lot of gold bullion was marketed from the N. P. Tract, where gold ore was opened and a three-stamp mill purchased for its treatment.

Nigger Hill district.—The output of the Nigger Hill district was three cars of oxidized lead ore from the Flora mine and the Emilda claim, which is owned by the Continental Divide Mining Co.

Ontario district (Elliston).—Three lode mines in the Ontario district produced 147 tons of ore, yielding $174 in gold, 1,297 ounces of silver, 110 pounds of copper, and 27,933 pounds of lead, valued in all at $3,232, or $21.99 in metals a ton. The Charter Oak property, 6 miles from Elliston on Little Blackfoot River, produced ore of milling grade that was concentrated and one lot of first-class lead ore. Two small cars of oxidized lead ore were also shipped from the Wolverine and Carbonate King properties by way of Elliston, on the Northern Pacific Railroad.

Ophir district.—A little exceptionally fine placer gold was recovered from claims near Avon.

Pioneer district (*Gold Creek*).—Six placers and three lode claims in the Pioneer district produced 23 tons of ore, $5,790 in gold, and 77 ounces of silver, valued together at $5,837. The ore had a value of $91.04 in metals a ton. Some unusually rich gold ore from the Pioneer group was ground in a mortar and treated by amalgamation. A little gold was also recovered from the Morning Glory and Independence claims; the latter is equipped with a 3-ton ball mill with an amalgamation plate. Most of the district output was placer gold, chiefly from the Friday claim. Gold was also recovered at the Pioneer, Oro Fino, Pikes Peak, and Magpie placers 11 miles west of Deer Lodge.

Zozell district.—The shaft at the Bonanza property was sunk 284 feet, and several cars of gold ore containing silver and lead were shipped to East Helena and Anaconda. Two cars of ore rich in gold and silver were shipped from the Blue Eyed Maggie mine, where a little drifting was done. Considerable lead-zinc ore containing a large amount of silver is exposed in a flat vein 6 inches wide.

RAVALLI COUNTY

Curlew district.—At the Curlew property near Victor copper-lead ore containing considerable gold and silver was treated by flotation and the resulting concentrate shipped to East Helena. Several thousand tons of ore has been exposed in the mine by drifting, and there is a large dump of old tailings from former work; part of this dump was re-treated, but the concentrate from the tailings was not marketed.

Overwich district (*Hughes Creek*).—A little placer gold was recovered by sluicing at the Brickley and other claims on Hughes Creek.

Pleasant View district.—One car of low-grade silver ore was shipped from the Pleasant View property near Victor.

SANDERS COUNTY

The value of the mine production of metals in Sanders County, part of which borders on the Coeur d'Alene region of Idaho, declined slightly from $13,485 in 1925 to $13,418 in 1926. The increase in the output of zinc nearly offset the decreases in gold, silver, copper, and lead. Most of the output was lead-zinc ore from the Broken Hill property near Heron.

Blue Creek district.—The Broken Hill property was worked several months under lease, and four cars of sulphide lead-zinc ore were shipped for export to Belgium. About 250 feet of prospecting was done.

Burns district.—A sample lot of lead ore was shipped from the Iron Daisy property, which is developed by tunnels aggregating 2,000 feet.

Perma district.—A little development work was done at the Glancus property, and a test sample of silver-lead ore was shipped to East Helena for smelting.

Seepy Creek district (*Belknap*).—Two cars of first-class copper ore were shipped from the L. & N. or Royal property near Belknap.

Thompson River district.—The output of the Thompson River district was one lot of lead ore from the Silver King property and one car of sulphide copper ore from the dump of the Copper King mine, 9 miles from Thompson Falls, on the Northern Pacific Railroad.

SILVER BOW COUNTY

Forty-six mines in Silver Bow County were productive in 1926, but most of the metal output resulted from the operations of seven companies. Although nearly all the large producing mines at Butte were active throughout the year the output of copper decreased more than 13,000,000 pounds. The larger part of the ore and old tailings mined or treated was concentrated at milling plants at Butte and Anaconda; the resulting products consisted of copper concentrates, lead concentrates, zinc concentrates, and lead-zinc concentrates, which yielded metals valued at $52,685,256, or $40.27 a ton of concentrates. The crude smelting ore yielded on the average $15.43 in metals a ton. No ore was treated by amalgamation or cyanidation. Old copper tailings and slime-pond material amounting to 45,163 tons were smelted. Of the total output of ore, old tailings, etc., in the county 80 per cent was classified as copper material.

Mine production of gold, silver, copper, lead, and zinc in Silver Bow County, Mont., 1925–26

Year	Mines producing	Ore, old tailings, etc.	Gold (lode and placer)	Silver (lode and placer)	Copper [1]	Lead	Zinc	Total value
		Short tons		*Fine ounces*	*Pounds*	*Pounds*	*Pounds*	
1925	48	3,862,401	$748,152	11,568,302	266,636,957	24,182,202	113,779,921	$57,390,128
1926	46	3,985,585	679,637	11,060,900	252,990,866	27,356,608	143,305,702	55,936,816

[1] Includes copper recovered from precipitates, as follows: 1925, 4,804,364 pounds; 1926, 5,044,108 pounds.

Divide Creek district.—One car of silver ore containing gold was shipped from the Gallinipper property by way of Melrose, and one test lot of rich silver ore was marketed from the Orphan Boy claim.

German Gulch district.—A little fine placer gold was recovered from claims in German Gulch.

Summit Valley or Butte district.—Forty-two lode mines in the Summit Valley district produced 3,985,549 tons of ore, old tailings, etc., which yielded $678,290 in gold, 11,058,861 ounces of silver, 252,990,866 pounds of copper (including 5,044,108 pounds from precipitates), 27,356,524 pounds of lead, and 143,305,702 pounds of zinc, valued in all at $55,934,190. Excluding the value of the copper recovered from precipitates the ore, old tailings, etc., yielded on the average $13.86 in metals a ton. The output consisted of 141,734 tons of first-class ore, 45,163 tons of old tailings and pond slimes smelted, and 3,489,845 tons of concentrating ore which, with 308,807 tons of old tailings, was reduced to 1,308,179 tons of concentrates.

The mines at Butte have been large producers for more than 40 years, and rich ore is still being mined at great depth. The Stewart mine is worked to a depth of 3,800 feet, and it is planned to do deep mining at the Badger State and other shafts.

From the beginning of activities in 1882 to the end of 1926 Silver Bow County, which includes the Butte district, has yielded gold, silver, copper, lead, and zinc valued at $1,954,858,563, as follows: Gold, $35,132,987; silver, $309,548,635; copper, $1,413,283,278; lead, $16,684,771; and zinc, $180,208,892. These values represent 1,699-558.20 ounces of gold, 422,430,774 ounces of silver, 9, 142,442,675 pounds of copper, 242,532,647 pounds of lead, and 2,133,803,734 pounds of zinc.

The mines of the Anaconda Copper Mining Co. according to the printed annual report for 1926 produced 2,562,344 tons of copper ore and 8,106 tons of precipitates, a total of 2,570,450 tons in 1926, against 2,855,148 tons in 1925. The concentrator treated 2,638,646 tons of copper ore and 308,805 tons of copper tailings. The copper-reduction works at Anaconda treated, for all companies, 2,882,903 tons of copper ore and other cupreous material. Of this material 2,570,162 tons came from company mines, 269,921 tons was either purchased from or treated for other companies, 38,034 tons came from old plants at Anaconda and Great Falls, and 4,780 tons from the zinc plant at Great Falls. The Anaconda works produced 254,317,367 pounds of fine copper, 8,227,178 ounces of silver, and 31,764.96 ounces of gold, and the greater part of this output came from the copper mines of the Anaconda Copper Mining Co. at Butte. A large quantity of silver and copper was recovered by the treatment at Anaconda of old sand tailings and slimes from ponds near the smelter.

The company owns 1,168 acres of mineral claims at Butte, to which it is constantly adding adjoining territory. It also works other property under lease, such as the Emma mine, and it obtained control of the Anselmo mine in 1926. Ore reserves and detailed costs are not made public. A general description of the geology, mining methods, underground workings, and reduction works is given in the Mines Handbook.[4]

The electrolytic copper refinery at Great Falls produced 243,285,551 pounds of cathodes, most of which were melted into shapes at Great Falls. The extension of the electrolytic copper refinery was completed during 1926, and the capacity of the plant is now 312,000,000 pounds of cathodes per annum. The new anode-scrap melting furnace was completed in July, and during the remainder of the year returned 18,521,225 pounds of anodes to the copper refinery. The extension of the rod mill was completed early in 1926 and the mill at Great Falls rolled 168,306,036 pounds of copper into rods; 41,527,844 pounds of rods were drawn into wire, of which 17,296,050 pounds were made into strand. In addition to the rods used locally 52,631,-475 pounds of rods were shipped to the Kenosha plant of the American Brass Co. to be drawn into wire.

During the year 478,994 tons of zinc ore was concentrated at Anaconda. Of this amount 17,312 tons was from the mines of the company and 461,682 tons was purchased from other producers located in the Butte district. From this ore there were produced

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[4] Neale, W. G., The Mines Handbook, vol. 17, 1926.

97,765 tons of zinc concentrates and 5,684 tons of lead concentrates. The two-unit extension to the zinc plant at Great Falls, construction of which was commenced in 1925, was completed and put into operation during January, 1926. The zinc plants treated 19,192 tons of ore produced by the mines of the company and 626,494 tons of purchased ore and concentrates, a total of 645,686 tons. The electrolytic zinc plant produced 225,857,493 pounds of slab zinc, 9,817,092 pounds of zinc in dross, 233,736 pounds of cadmium, and residue from which there were recovered 22,691,226 pounds of lead, 2,151,963 pounds of copper, 3,209,868 ounces of silver, and 7,080.43 ounces of gold. Dividends amounting to $9,000,000 were paid in 1926 by the Anaconda Co., and the net income for the year was $14,226,203, which, added to the balance at the end of the year 1925, gives a surplus of $88,287,400 after deduction of dividends. The company's annual report says:

> The operations of the company and its subsidiary and affiliated companies were conducted without interruption during the year and on about the same scale as during the year 1925. * * *
>
> In December the company purchased the outstanding stock of the Anselmo Mining Corporation and is now the owner of all of the issued stock of that corporation. * * *
>
> The construction expenditures during the year at the Butte mines in installing hoists amounted to $1,482,317. * * *
>
> During the year 1926 there were done in the mines of the company in the form of drifts, crosscuts, raises, winzes, and shafts, 34.41 miles of development work, as compared with 34.19 miles during the year 1925, an increase of 0.64 per cent. * * *
>
> As a by-product of copper smelting operations, 6,864,718 pounds of arsenic were produced, of which 6,668,068 pounds were refined.

The company continued to do a large business in lumber, coal, fertilizer, and sulphuric acid in Montana; in metal roofing, brass, and refining in the east; mining, milling, and smelting in Utah, Arizona, California, and Colorado; and mining and milling in South America. Large coal and zinc mines in Polish Silesia were acquired in 1926.

The Anselmo Mining Corporation operated its property at Butte nearly the entire year, but in December the Anaconda Copper Mining Co. purchased the outstanding half of the issued stock of the company, thereby becoming the owner of all the issued stock of the Anselmo Mining Corporation. The mine was a large producer of silver, copper, and zinc, being third in the production of copper and seventh in the production of silver in Montana. Copper ore and zinc ore in large quantities were shipped to Anaconda for milling, copper concentrate being smelted at Anaconda and several thousand tons of zinc concentrate being shipped to Great Falls for roasting and leaching. The mine has been a producer since 1918, and the output was especially large after 1922.

The Emma mine, owned by the Butte Copper & Zinc Co., was operated by the Anaconda Copper Mining Co. More than 146,000 tons of lead-zinc ore, containing considerable silver, was shipped to Anaconda for milling. Most of the concentrate produced there was shipped to Great Falls for treatment in the electrolytic zinc plant. As the ore from the Emma mine contains more lead than the Anselmo or other properties at Butte the lead concentrate is separated for shipment to East Helena. The property was the largest producer of lead in Montana, second in the production of zinc, and fourth in the output of silver in 1926. From 146,988 tons of lead-zinc ore the Butte Copper & Zinc Co. received $275,923. The net income for the year was $194,524. After payment of dividends of $300,000 the surplus was $390,256. The following paragraphs are taken from the printed report of the Butte Copper & Zinc Co. for 1926:

> The net returns of the company for the year 1926 were not as large as those of the previous year, due, primarily, to the inability to market any manganese ores, thereby curtailing the revenues and increasing the cost per ton of extraction of the zinc ores. In addition to this, prices for lead and zinc were lower. * * *
>
> The underground developments have been satisfactory. The main shaft has been sunk to the 1,400-foot level, and crosscutting for the vein is now in progress. The crosscut at the present time is over 1,000 feet in length.
>
> The large ore body on the east end of the 1,200-foot level has been cut by a very large fault, and the drift is now being driven through the fault to encounter the vein on the other side. The vein at the point at which it was cut off showed a body of ore of good width and carrying values as high as any that have been encountered in the mine. * * *
>
> During the year the Railroad claim, lying to the south of the Mary Louise claim, was purchased by the company.
>
> It was felt that the stockholders were entitled to idle funds being held in the treasury, and a dividend of 50 cents a share was paid.

The Eveline & Twilight property, owned by the Clark-Montana Realty Co., was operated the entire year. The mine is opened by a vertical shaft 730 feet deep, and 4,700 feet of work was done in drifts, raises, and crosscuts during the year. Nearly 1,400 tons of first-class silver ore was shipped for smelting, and more than 3,000 tons of lead-zinc ore shipped to Anaconda for milling.

The Butte & Superior Mining Co. worked the Black Rock mine 337 days during the year and shipped nearly 400,000 tons of copper ore and lead-zinc ore for milling. The property is opened to a depth of 3,000 feet by nearly 248,000 feet of underground workings. In 1926 more than 29,000 feet of work was done in prospecting for ore that contains sphalerite, galena, and various sulphide copper minerals. For three years both the copper ore and the lead-zinc ore have been shipped to Anaconda for milling, the old milling plant at Butte having been dismantled. The property held the record of being the largest zinc producer in Montana in 1926 and was second in the production of silver, copper, and lead. During the year the company paid dividends amounting to $580,395, or a total of $18,536,345 to date. As a result of ore sales the company received $3,154,646. The cost of mining, development, and general expenses was $2,558,068, leaving an operating profit of $596,578, or a net income, without deduction for depletion, of $496,004. After paying the capital distributions and miscellaneous adjustments the company had a surplus of $270,275 at the end of the year. The following paragraphs were taken from the company's printed report for 1926:

> The tonnage of zinc ore carried in regularly stated ore reserves decreased during the year some 60,000 tons, but the average grade of reserves increased to a degree just about sufficient to offset the difference in tonnage and therefore recoverable metals contained in developed zinc ore at the end of the year were substantially the same in quantity as shown by statements for the year 1925.
>
> The above stated figures do not take into account some 150,000 tons of good grade ore known to be available from old upper workings and, altogether, the developed zinc ore reserve situation at the end of 1926 is little different from that at the end of the previous year, the actually proven reserves being sufficient to support production at current rates for approximately two years.

Explorations for copper ores continued disappointing; the so-called copper vein has not shown any commercial ores extending below the 2,800-foot level and only small tonnages below the 2,500-foot level. This vein is entirely outside of and apart from the main Rainbow lode, which has supplied nearly all zinc ores to date. This copper ore occurrence was encountered at the 1,800-foot level and has been explored to and on the 3,400-foot level, with results entirely negative for the last 600 feet in depth and practically so for 800 feet between the 2,600 and 3,400 foot levels. This vein has also been explored by drifts, raises, and drilling along its strike in both directions on a number of levels, and it seems that the possibilities of finding further tonnages of commercial ore in connection with this particular occurrence have been entirely delimited. The remaining reserves amount, at current rate of production, to less than a year's supply, and even at that the grade is barely sufficient to justify production at prevailing prices of copper. * * *

Development work consisted of 22,550 feet of drifts and crosscuts, 6,370 feet of raises, and 460 feet of shaft and station development.

No. 3 main hoisting shaft was sunk for one full compartment and manway, from the 3,100 level to a point 41 feet below the 3,400 level, or a total depth of 3,441 feet for the shaft.

The development program which was inaugurated in 1925, toward reclaiming remnants of zinc ore bodies left behind in early operations on the upper levels, was continued with uniformly satisfactory results and a total of 146,870 tons of zinc ore was developed above the 1,300 level. Of this 60,457 tons came from the abandoned ore estimated at the beginning of the year to be recoverable and the balance of 86,423 tons was ore not previously considered available. At the end of the year there remains in these old ore bodies 148,824 dry tons, with an estimated assay of 6.20 ounces of silver and 13.71 per cent of zinc. * * * Further zinc ore development was continued on the deeper levels and resulted in finding additional tonnages down to and including the 3,000 level, on which latter no ore had been developed at the end of the year 1925. During the year there was opened up from the 1,300 level to and including the 3,000 level 106,283 tons of commercial zinc ore. * * *

Copper development on the main copper vein was unsatisfactory, and copper ore reserves were diminished about 150,000 tons during the year. * * *

The estimated ore reserves as of December 31, 1926, follow: Zinc ore of commercial grade, 330,888 tons, averaging 14.89 per cent of zinc and 5.11 ounces of silver; zinc ore of noncommercial grade, 118,225 tons, averaging 7.36 per cent of zinc and 1.86 ounces of silver; copper ore, 70,640 tons, averaging 3.80 per cent of copper and 6.41 ounces of silver.

The total zinc ore produced during the year amounted to 299,857 dry tons, containing a total of 1,348 ounces of gold, 1,479,802 ounces of silver, 1,486,822 pounds of copper, 8,444,990 pounds of lead, and 69,790,230 pounds of zinc, or an average assay of 0.0045 ounce of gold, 4.93 ounces of silver, 0.25 per cent of copper, 1.41 per cent of lead, and 11.64 per cent of zinc.

The production of copper ore was 94,638 dry tons, containing a total of 462 ounces of gold, 563,522 ounces of silver, and 7,166,249 pounds of copper, * * *, or an average assay of 0.005 ounce of gold, 5.95 ounces of silver, and 3.79 per cent of copper, * * *.

The production of copper ore was lower both as to tonnage and metal content than for the year 1925, but the quantity and grade of the zinc ore increased. * * *

The entire production for the year of both zinc and copper ores was sold to the Anaconda Copper Mining Co.

The Pittsmont mine of the East Butte Copper Mining Co. was operated the entire year, but both the milling and smelting plants were idle. The mine produced two classes of copper ore—the first-class product smelted at Anaconda and the copper ore of milling grade treated by concentration and flotation at Anaconda. The property is worked through three vertical shafts, the deepest of which is 2,440 feet, and more than 30 miles of crosscuts and drifts. In 1926 development consisted of 7,400 feet of crosscuts, drifts, and raises. In the past the company has paid $1,676,370 in dividends, but no distributions were made in 1926, when the property was fourth in the production of copper in the State. From the Pittsmont property the company mined 58,968 dry tons of ore, averaging 5.05 per cent of copper and 3.73 ounces of silver to the ton. The metal content was reported as 31 ounces of gold, 219,792 ounces of silver, and 5,955,482 pounds of copper, but no statement is published giving the results after milling and smelting the ore at Anaconda. The value of the ore shipped in 1926 was $486,067, but the operating cost was $619,795. The company, which also operated property in Colorado and Nevada, gave the following paragraphs regarding the Pittsmont mine at Butte in its annual printed report for 1926:

> Pittsmont operations at Butte resulted in a loss of $90,850 before depreciation on equipment and mine depletion. The average grade of ore mined during 1926 was the highest of any year since 1913, but the small tonnage produced was a contributing factor to the year's loss, as was the large amount expended on development which totaled $162,644. Low metal prices, which prevailed throughout the year, and the scarcity of competent miners during the summer months were other serious contributing causes.
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> The falling off in values in "45" ledge between the 2,000 level and the 1,800 level, and "12" ledge between the 1,800 and 1,500 levels were for the most part responsible for the small tonnage obtained from stoping operations, as sections in these ledges substantial in size are not minable at prices received for metals in recent years.
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> Development costs constituted 26.42 per cent of the total mining cost, and the work accomplished amounted to 7,419 feet of crosscutting, drifting, and upraising. Of the total progress made, 2,433 feet was done on the 2,400, the deepest level in the mine, and 1,332 feet on the 2,200 level, the opening of the latter having been started during 1926.
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> The reserves of known ore at the end of the year are estimated at 125,000 tons including a substantial tonnage expected from two veins extending into ground adjoining the property to the west, on which the right to mine has been obtained on a lease basis considered favorable to the company.

The Elm Orlu mine at Butte was operated virtually the entire year and made a large production of silver, copper, lead, and zinc, chiefly from lead-zinc ore milled at the Timber Butte flotation plant, south of Butte. Several thousand tons of copper ore was shipped to Anaconda for milling. The property was fifth in the production of silver and lead in Montana in 1926 and third in the production of zinc, after the Butte & Superior and Emma. The mine is opened to a depth of 3,400 feet by various workings, and more than 7,000 feet of development work was done in raises, drifts, and crosscuts in 1926. Further details of operations are not published, as the company issued no printed report.

The Timber Butte flotation mill south of Butte was active the entire year, treating ore from the Clark properties, especially from the Elm Orlu mine, as well as custom ore from various mines in the State. An article [5] published in 1925 described the plant and the methods of treating various ores.

The Crystal Copper Co., operating the Goldsmith, Amy Silversmith, and St. Clair properties, shipped several hundred tons of silver ore for smelting and a little lead-zinc ore to the custom mill at Butte. The output declined to a marked degree on account of the fire in February when the mine was flooded. The damage was repaired, however, and the mine plant rebuilt late in the year.

The Lizzie mine, under lease, produced more than 1,200 tons of first-class copper ore and a little lead-zinc ore of milling grade.

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[5] Robie, E. H. "Selective flotation at Timber Butte": Eng. and Min. Jour.-Press, vol. 120, Oct. 31, 1925, p. 685.

The Minnie Jane property of the Butte West Side Mines Co. was worked only part of the year, but lead-zinc milling ore was treated at Butte, and a little siliceous ore containing gold and silver was shipped for smelting at Anaconda. About 350 feet of development work was done before December, when the property was closed.

The Poser mine was operated nearly the entire year through the shaft of the Elm Orlu mine. Development work consisted of more than 13,000 feet of drifts, raises, crosscuts, and winzes. The mine has become an important producer of silver, lead, and zinc, as a result of large shipments of ore to the Timber Butte mill, which increased more than 60 per cent in 1926. The property was third in the production of lead in Montana in 1926 and fourth in the production of zinc. The Moulton mine was continuously operated, and more than 30,000 tons of lead-zinc ore was treated at the Timber Butte mill. The property is opened by a vertical shaft 1,530 feet deep, and more than 6,000 feet of development was done in 1926 in drifts, crosscuts, and raises as well as considerable work in station cutting. Lead concentrates shipped to East Helena and zinc concentrates treated at Great Falls yielded more than 3,000,000 pounds of zinc, 1,600,000 pounds of lead, and more than 100,000 ounces of silver.

Although shipments of ore from the property of the Midwest Butte Development Co. were discontinued after June 30, more than 2,000 tons of silver-lead-zinc ore was treated at Butte and Anaconda. The ore made a good milling product, as it contained 4 to 9 ounces of silver to the ton, 4 to 8 per cent of lead, and 7 to 16 per cent of zinc in minerals that could readily be separated by flotation.

Shipments of ore from the Mountain Chief property increased considerably, the property having produced more than 5,000 tons of silver-copper ore of smelting grade in 1926.

The North Butte Mining Co. worked the Granite Mountain and Speculator groups and shipped, as the result of operations of lessees, considerable copper ore and zinc ore. The North Butte property was a large producer of copper from 1902 to 1920 and was consolidated with the property of the Tuolumne Copper Co. in February, 1926. Both the copper ore and zinc ore were shipped to Anaconda for milling or smelting. After the merger of the North Butte and the Tuolumne properties was approved the mine was unwatered to the 2,800-foot level, leases were given, and about 3,000 tons of ore a month was produced. The company also planned doing development work east of the Continental fault in Tuolumne ground.

Considerable development work in drifts and crosscuts was done at the Otisco property, from which about 1,000 tons of lead-zinc ore was shipped for treatment at Butte. In addition to the copper, lead, and zinc minerals—chalcopyrite, galena, and sphalerite—the ore contained magnetite, pyrite, rhodonite, and rhodochrosite.

Other properties at Butte that shipped several hundred tons of ore each in 1926 were the Salvador, Lavena, Minnie Irvine, and Ballaklava. Small shipments were made from the Brewer, Bullwhacker, Cripple, Flint Creek, Jennie Dell, Little St. Lawrence, Narrow Gauge, Brittania, Elba, Seymour, Venus, Chicago, Florence, I. X. L., and Vadnais Polydor claims.

GOLD, SILVER, COPPER, LEAD, AND ZINC IN IDAHO

(MINE REPORT)

By C. N. Gerry[1]

SUMMARY

The value of the mine production of gold, silver, copper, lead, and zinc in Idaho increased from $30,662,621 in 1925 to $30,969,551 in 1926. Large increases in the quantity of lead and zinc more than offset the decreases in gold, silver, and copper. The total value of the metal output has gradually increased since 1921, when it was unusually low, and in 1926 it was more than the average annual value for the decade 1917 to 1926, which was $28,991,275. Since 1863, Idaho has yielded an output of the five metals, as follows: Gold, $135,898,039; silver, 289,713,237 fine ounces; copper, 144,884,353 pounds; lead, 7,909,627,470 pounds; and zinc, 561,594,679 pounds. The total value has been $852,630,801, of which lead has supplied the largest part. The value of the output of Idaho from the early days of mining is by no means as large as that of Arizona, California, Colorado, Montana, or Utah, but in 1926 Idaho was third in silver output after Utah and Montana, and third in lead output after Missouri and Utah. Dividends for 1926, taken largely from the annual printed reports of the companies, but partly estimated, amounted to $8,135,587. It is impossible to procure the exact total, as part of the dividend disbursement is paid from operations in other States, and the amount paid by certain lessees is not reported.

Although the metal output of Idaho in 1926 was derived from 29 counties, most of the silver, copper, lead, and zinc was recovered from ore, concentrates, and bullion from Shoshone County, or the famous Coeur d'Alene region, whose total metal output was valued at $29,000,000. Lemhi, Custer, Boundary, and Bonner Counties followed in order, but no one of them attained an output valued at as much as $1,000,000 in 1926.

Tables printed in Mineral Resources for 1922 and subsequent years give the source of the different metals by kinds of ore and by years from 1911 to 1926. During that period 86 per cent of the gold was derived from dry and siliceous ore and from placers. About 77 per cent of the silver and about 81 per cent of the lead came from lead ore and most of the remainder from lead-zinc ore and zinc ore.

The prices given in the table that follows are those at which the values for metals in this report have been calculated. The silver prices for 1917 and 1919 are dealers' buying price, New York; for

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[1] The valuable assistance of B. N. Lowry and Paul Luff, of the Bureau of Mines, is acknowledged.

1918, average price as stated by the Bureau of the Mint; for 1920 to 1922, New York market price for domestic silver only; for 1923, average price under the Pittman Act, from January 1 to June 2, for domestic silver, and average New York price for all silver after that period; for 1924 and later years, average New York price for bar silver. The copper, lead, and zinc prices are weighted averages, for each year, of all grades of primary metal sold by producers.

Prices of silver, copper, lead, and zinc, 1917–1926

Year	Silver	Copper	Lead	Zinc	Year	Silver	Copper	Lead	Zinc
	Per fine ounce	*Per pound*	*Per pound*	*Per pound*		*Per fine ounce*	*Per pound*	*Per pound*	*Per pound*
1917	$0. 824	$0. 273	$0. 086	$0. 102	1922	$1. 00	$0. 135	$0. 055	$0. 057
1918	1. 00	. 247	. 071	. 091	1923	. 82	. 147	. 070	. 068
1919	1. 12	. 186	. 053	. 073	1924	. 67	. 131	. 080	. 065
1920	1. 09	. 184	. 080	. 081	1925	. 694	. 142	. 087	. 076
1921	1. 00	. 129	. 045	. 050	1926	. 624	. 140	. 080	. 075

Mine production of gold, silver, copper, lead, and zinc in Idaho, 1917–1926

Year	Mines producing		Ore, old tailings, etc. (short tons)	Gold		Silver	
	Lode	Placer		Fine ounces	Value	Fine ounces	Value
1917	247	112	2, 758, 507	38, 932. 64	$804, 809	12, 029, 338	$9, 912, 175
1918	216	85	2, 091, 619	33, 998. 72	702, 816	9, 172, 340	9, 172, 340
1919	138	72	1, 457, 395	34, 502. 89	713, 238	5, 579, 056	6, 248, 543
1920	114	49	1, 958, 401	23, 490. 42	485, 590	7, 326, 794	7, 986, 205
1921	133	92	1, 514, 447	26, 399. 73	545, 731	6, 080, 528	6, 080, 528
1922	154	94	1, 436, 884	24, 255. 46	501, 405	6, 081, 865	6, 081, 865
1923	146	85	1, 763, 520	37, 124. 28	767, 427	7, 673, 662	6, 292, 403
1924	141	79	1, 711, 988	26, 921. 80	556, 523	7, 793, 154	5, 221, 413
1925	190	85	1, 827, 715	20, 886. 92	431, 771	7, 743, 439	5, 373, 947
1926	177	69	1, 934, 143	13, 669. 27	282, 569	7, 556, 444	4, 715, 221

Year	Copper		Lead		Zinc		Total value
	Pounds	Value	Pounds	Value	Pounds	Value	
1917	7, 827, 574	$2, 136, 928	393, 559, 521	$33, 846, 119	79, 854, 136	$8, 145, 122	$54, 845, 153
1918	6, 533, 888	1, 613, 870	294, 695, 993	20, 923, 416	45, 161, 712	4, 109, 716	36, 522, 158
1919	3, 122, 763	580, 834	182, 341, 898	9, 664, 121	15, 994, 229	1, 167, 579	18, 374, 315
1920	2, 538, 396	467, 065	249, 609, 976	19, 968, 798	27, 932, 326	2, 262, 518	31, 170, 176
1921	1, 688, 195	217, 777	198, 469, 119	8, 931, 110	33, 463	1, 673	15, 776, 819
1922	3, 282, 842	443, 184	195, 834, 205	10, 770, 881	4, 109, 131	234, 220	18, 031, 555
1923	3, 979, 631	585, 006	242, 355, 733	16, 964, 901	27, 952, 749	1, 900, 787	26, 510, 524
1924	2, 738, 824	358, 786	248, 950, 292	19, 916, 023	15, 340, 498	997, 132	27, 049, 877
1925	3, 297, 443	468, 237	253, 041, 790	22, 014, 636	31, 237, 240	2, 374, 030	30, 662, 621
1926	1, 337, 442	187, 242	272, 980, 212	21, 838, 417	52, 614, 691	3, 946, 102	30, 969, 551

Gold and silver produced at placer mines in Idaho, 1917–1926

Year	Gold		Silver		Year	Gold		Silver	
	Fine ounces	Value	Fine ounces	Value		Fine ounces	Value	Fine ounces	Value
1917	6, 541. 80	$135, 231	1, 194	$984	1922	8, 899. 64	$183, 972	1, 959	$1, 959
1918	13, 371. 33	276, 410	3, 283	3, 283	1923	24, 125. 05	498, 709	6, 616	5, 425
1919	9, 227. 63	190, 752	1, 902	2, 130	1924	17, 324. 10	358, 121	4, 248	2, 846
1920	5, 505. 76	113, 814	1, 119	1, 219	1925	12, 692. 92	262, 386	2, 812	1, 952
1921	8, 784. 90	181, 600	1, 686	1, 686	1926	8, 360. 45	172, 826	2, 029	1, 266

GOLD

The mine production of gold in Idaho in 1926 was $282,569, a decline of nearly 35 per cent from 1925, and was the lowest for the decade 1917 to 1926, the average annual output for which was about $579,200. The gold output from Idaho was decreasing steadily before 1920, but dredges in Elmore and Shoshone Counties brought up the output in 1923. In 1926, however, the gold from both lode and placer mines decreased, especially from placers worked by dredges; the lode mines yielded $109,743 in gold and the placers $172,826, of which $141,160 was won by dredges. Gold from gold ore, copper ore, and placers decreased materially, but a slight increase was recorded from lead ore. The production of gold from mills using amalgamation was 2,030.09 ounces in 1926, or only 15 per cent of the total gold output, a decrease from 2,431.28 ounces in 1925. Concentrates of all kinds yielded 16 per cent of the total gold, crude ore shipped for smelting yielded 8 per cent, and placers yielded 61 per cent. Since 1897 gold worth $5,779,398 has been recovered by dredges.

In 1926 only four mines had a gold output of more than $20,000 each—those of the South Park Dredging Co. at Featherville, the Yukon Gold Co. at Murray, the Gold Dredging & Power Corporation at Centerville, and the Idawa Gold Mining Co. at Placerville.

SILVER

In 1926 the mine production of silver in Idaho declined more than 2 per cent in quantity and was decidedly less than the yearly average of the decade 1917 to 1926, which was about 7,703,600 ounces. Compared with other large producing States Idaho produced more silver than Arizona or Nevada but less than Utah or Montana. The output of silver in Shoshone County increased 250,327 ounces and there were also increases in Lemhi and Boise Counties, but the output from Bonner, Custer, and Blaine Counties was much smaller. The decline in silver was due largely to the decided decrease in shipments of copper concentrate rich in silver from the Talache mine in Bonner County.

Concentrates yielded 81 per cent of the silver, smelting ore nearly 19 per cent, and placer bullion and gold and silver bullion from lode mines less than one-tenth of 1 per cent.

The Morning mine of the Federal Mining & Smelting Co. was the largest producer of silver, followed closely by the Hecla and the Bunker Hill & Sullivan properties, each yielding more than 1,000,000 ounces of silver. Other large producers of silver were the Sunshine, Gold Hunter, Crescent, Tamarack & Custer, Star, and United Idaho (Pittsburg-Idaho) mines.

COPPER

The mine production of copper decreased 59 per cent in quantity from 1925 as a result of the curtailed output of the Idaho Metals Co. at Mackay, Custer County. The average yearly output of the State for the decade 1917 to 1926 was about 3,634,700 pounds; during the last five years (1922–1926) the average was less than 3,000,000 pounds; and in 1926 the production was only 1,337,442 pounds, the smallest output since 1894. The production of copper in Custer County decreased from 2,448,649 pounds in 1925 to 262,769 pounds in 1926; the output from Shoshone County increased from 620,444 to 962,447 pounds. Crude smelting ore of all kinds furnished 22 per cent and concentrates 78 per cent of the copper.

The largest producers of copper in the State in 1926 were the Hecla mine at Burke, Shoshone County; the Idaho Metals Co. at Mackay, Custer County; and the Snow Storm, Morning, Sunshine, and Crescent mines in Shoshone County.

LEAD

The mine production of lead in 1926 was the largest since 1918. It increased nearly 8 per cent in quantity over 1925, but the total value decreased $176,219, as the average price of lead declined from 8.7 cents a pound in 1925 to 8 cents in 1926. Shoshone County supplied more than 94 per cent of the total output, and Lemhi, Custer, Boundary, and Bonner Counties made a good production. Concentrates of all kinds yielded nearly 82 per cent and crude smelting ore 18 per cent of the total.

Nine mines produced more than 3,000,000 pounds of lead each in 1926. Three of them—the Bunker Hill & Sullivan, Morning, and Hecla—yielded more than 55,000,000 pounds each; the other large producers were the Tamarack & Custer, Star (Sullivan Mining Co.), Gold Hunter, United Idaho, Livingston, and Idaho-Continental mines. The general increase was due chiefly to activity at the Star and Morning mines.

ZINC

The mine production of zinc in 1926 amounted to 52,614,691 pounds, the largest output since 1917 and an increase of more than 68 per cent over the output of 1925. The gain was due to the large increase in lead-zinc ore mined at the Morning and Star mines near Mullan and from renewed activity in the Pine Creek section. All the zinc concentrates, except a few lots from Blaine and Custer Counties, came from the Coeur d'Alene region, where the largest producers of zinc were the Morning, Star, Constitution, Highland-Surprise, Sidney, and Success mines. Ore that was not milled locally was shipped to custom milling plants at Butte and Anaconda, Mont. The resulting zinc products were treated at the electrolytic zinc plant near Great Falls, Mont., or shipped to Portland, Oreg., for export.

Mine production of gold, silver, copper, lead, and zinc, in Idaho, 1925–26, by counties

1925

County	Ore and old tailings (short tons)	Gold					Silver (lode and placer)	
		Lode		Placer		Total value	Fine ounces	Value
		Fine ounces	Value	Fine ounces	Value			
Ada	52	26.80	$554	6.48	$134	$688	55	$38
Adams	400			7.01	145	145	1,628	1,130
Bannock	4			2.22	46	46		
Bear Lake	6						5	4
Benewah				1.60	33	33		
Bingham				34.59	715	715	2	1
Blaine	1,821	153.44	3,172			3,172	115,094	79,875
Boise	9,972	1,685.92	34,851	562.84	11,635	46,486	4,761	3,304
Bonner	16,296	693.07	14,327			14,327	440,833	305,938
Bonneville				18.43	381	381		
Boundary	27,987	268.00	5,540			5,540	59,811	41,509
Butte	4,048	1.31	27			27	8,392	5,824
Camas	22	25.78	533			533	86	60
Canyon				1.21	25	25		
Cassia	30	25.06	518			518	359	249
Clark	5						19	13
Clearwater				59.31	1,226	1,226	12	8
Custer	38,049	2,181.86	45,103	12.91	267	45,370	294,032	204,058
Elmore	54	53.65	1,109	5,545.03	114,626	115,735	1,859	1,290
Gem	12	9.34	193	9.53	197	390	7	5
Idaho	1,792	1,157.95	23,937	440.46	9,105	33,042	832	578
Jerome				5.47	113	113		
Latah	54	1.21	25	7.35	152	177	35	24
Lemhi	12,131	507.50	10,491	146.63	3,031	13,522	95,694	66,412
Owyhee	485	413.02	8,538			8,538	18,112	12,570
Power				7.55	156	156		
Shoshone	1,714,159	848.84	17,547	5,766.15	119,197	136,744	6,701,747	4,651,013
Twin Falls				7.98	165	165		
Valley	36	16.06	332	24.43	505	837	9	6
Washington	300	125.19	2,588	25.74	532	3,120	55	38
	1,827,715	8,194.00	169,385	12,692.92	262,386	431,771	7,743,439	5,373,947

County	Copper		Lead		Zinc		Total value
	Pounds	Value	Pounds	Value	Pounds	Value	
Ada	159	$23					$749
Adams					34,377	$2,612	3,887
Bannock	12	2	1,424	$124			172
Bear Lake			4,749	413			417
Benewah							33
Bingham							716
Blaine	9,004	1,279	919,344	79,983	27,514	2,091	166,400
Boise	3,323	472	19,404	1,688			51,950
Bonner	150,374	21,353	310,239	26,991	5,630	428	369,037
Bonneville							381
Boundary			3,016,297	262,418			309,467
Butte	646	92	1,233,463	107,311			113,254
Camas	32	4	2,582	225			822
Canyon							25
Cassia	315	45	22,619	1,968			2,780
Clark			1,160	101			114
Clearwater							1,234
Custer	2,448,649	347,708	2,067,352	179,859			776,995
Elmore							117,025
Gem							395
Idaho							33,620
Jerome							113
Latah	12,834	1,822					2,023
Lemhi	51,528	7,317	3,731,184	324,613	14,682	1,116	412,980
Owyhee	123	17					21,125
Power							156
Shoshone	620,444	88,103	241,711,973	21,028,942	31,155,037	2,367,783	28,272,585
Twin Falls							165
Valley							843
Washington							3,158
	3,297,443	468,237	253,041,790	22,014,636	31,237,240	2,374,030	30,662,621

Mine production of gold, silver, copper, lead, and zinc in Idaho, 1925–26, by counties—Continued

1926

County	Ore, old tailings, etc. (short tons)	Gold					Silver (lode and placer)	
		Lode		Placer		Total value	Fine ounces	Value
		Fine ounces	Value	Fine ounces	Value			
Ada	1	0.63	$13	5.71	$118	$131	1	$1
Adams				.97	20	20		
Bear Lake	1						1	1
Bingham				.53	11	11		
Blaine	981	49.58	1,025			1,025	65,255	40,719
Boise	5,559	2,156.85	44,586	1,799.11	37,191	81,777	8,702	5,430
Bonner	3,868	167.96	3,472			3,472	143,023	89,246
Bonneville	2	1.40	29	37.30	771	800	2	1
Boundary	23,572						58,677	36,614
Butte	1,781	2.13	44			44	6,958	4,342
Camas	15	19.50	403	.82	17	420	6	4
Canyon				.82	17	17		
Cassia	43	26.70	552			552	393	245
Clark	130	.10	2			2	196	122
Clearwater				40.39	835	835	7	4
Custer	21,539	330.98	6,842	25.98	537	7,379	146,116	91,176
Elmore	183	144.54	2,988	3,421.95	70,738	73,726	1,190	743
Gem	1	1.50	31	2.56	53	84	1	1
Idaho	342	210.10	4,343	449.64	9,295	13,638	223	139
Jerome				11.27	233	233	1	1
Kootenai	3						11	7
Latah				14.61	302	302		
Lemhi	24,153	531.98	10,997	105.70	2,185	13,182	158,784	99,081
Owyhee	621	190.06	3,929			3,929	13,848	8,641
Power				8.32	172	172		
Shoshone	1,850,519	1,198.20	24,769	2,242.91	46,365	71,134	6,952,074	4,338,094
Twin Falls				53.99	1,116	1,116	3	2
Valley	827	275.25	5,690	108.51	2,243	7,933	968	604
Washington	2	1.36	28	29.36	607	635	4	3
	1,934,143	5,308.82	109,743	8,360.45	172,826	282,569	7,556,444	4,715,221

County	Copper		Lead		Zinc		Total value
	Pounds	Value	Pounds	Value	Pounds	Value	
Ada							$132
Adams							20
Bear Lake			735	$59			60
Bingham							11
Blaine	5,573	$780	580,592	46,447	3,838	$288	89,259
Boise	3,060	428	82,039	6,563			94,198
Bonner	39,448	5,523	967,468	77,397			175,638
Bonneville							801
Boundary	2,518	352	3,193,885	255,511			292,477
Butte	1,637	229	523,510	41,881			46,496
Camas							424
Canyon							17
Cassia	551	77	29,284	2,343			3,217
Clark			41,553	3,324			3,448
Clearwater							839
Custer	262,769	36,788	4,015,340	321,227	67,730	5,080	461,650
Elmore							74,469
Gem							85
Idaho							13,777
Jerome							234
Kootenai			685	55			62
Latah							302
Lemhi	59,155	8,282	5,874,008	469,921	9,638	723	591,189
Owyhee	265	37	3,028	242			12,849
Power							172
Shoshone	962,447	134,743	257,667,986	20,613,439	52,533,485	3,940,011	29,097,421
Twin Falls							1,118
Valley	19	3	99	8			8,548
Washington							638
	1,337,442	187,242	272,980,212	21,838,417	52,614,691	3,946,102	30,969,551

Ore, old tailings, etc., sold or treated, lode mines producing, and average value of ore, etc., in Idaho, 1925–26, by counties

County	Ore, old tailings, etc. (short tons)		Lode mines producing		Average value per ton in all metals		Average value per ton in gold and silver	
	1925	1926	1925	1926	1925	1926	1925	1926
Ada	52	1	2	1	$11.81	$13.00	$11.37	$13.00
Adams	400	-----	1	-----	9.36	-----	2.83	-----
Bannock	4	-----	1	-----	31.50	-----	-----	-----
Bear Lake	6	1	1	1	69.50	60.00	.67	1.00
Blaine	1,821	981	28	20	91.38	90.99	45.61	42.55
Boise	9,972	5,559	13	12	4.03	10.20	3.82	8.94
Bonner	16,296	3,868	10	7	22.65	45.41	19.65	23.97
Bonneville	-----	2	-----	1	-----	14.50	-----	14.50
Boundary	27,987	23,572	2	1	11.06	12.41	1.68	1.55
Butte	4,048	1,781	4	8	27.98	26.11	1.45	2.46
Camas	22	15	5	1	37.36	27.13	26.95	27.13
Cassia	30	43	2	2	92.67	74.81	25.57	18.53
Clark	5	130	1	1	22.80	26.52	2.60	.95
Custer	38,049	21,539	19	10	20.41	21.41	6.55	4.55
Elmore	54	183	5	8	20.81	16.58	20.81	16.58
Gem	12	1	1	1	16.50	32.00	16.50	32.00
Idaho	1,792	342	8	5	13.65	12.95	13.65	12.95
Kootenai	-----	3	-----	1	-----	20.67	-----	2.33
Latah	54	-----	1	-----	34.65	-----	.91	-----
Lemhi	12,131	24,153	22	21	33.79	24.39	6.34	4.56
Owyhee	485	621	13	13	43.56	20.69	43.52	20.24
Shoshone	1,714,159	1,850,519	48	58	16.42	15.70	2.72	2.36
Valley	36	827	2	4	9.36	7.58	9.36	7.57
Washington	300	2	1	1	8.75	14.00	8.75	14.00
	1,827,715	1,934,143	190	177	16.63	15.92	3.03	2.49

Production of placer mines in Idaho, 1925–26, by counties

County	1925						1926					
	Mines			Gold	Silver (fine ounces)	Total value	Mines			Gold	Silver (fine ounces)	Total value
	Hydraulic and sluicing	Dredge	Drift				Hydraulic and sluicing	Dredge	Drift			
Ada	4	-----	-----	$134	1	$135	1	-----	-----	$118	1	$119
Adams	1	-----	-----	145	-----	145	1	-----	-----	20	-----	20
Bannock	1	-----	-----	46	-----	46	-----	-----	-----	-----	-----	-----
Benewah	1	-----	-----	33	-----	33	-----	-----	-----	-----	-----	-----
Bingham	4	-----	-----	715	2	716	1	-----	-----	11	-----	11
Boise	10	-----	-----	11,635	151	11,740	8	1	-----	37,191	514	37,512
Bonneville	2	-----	-----	381	-----	381	2	-----	-----	771	2	772
Camas	-----	-----	-----	-----	-----	-----	1	-----	-----	17	-----	17
Canyon	1	-----	-----	25	-----	25	1	-----	-----	17	-----	17
Clearwater	6	-----	-----	1,226	12	1,234	4	-----	-----	835	7	839
Custer	3	-----	-----	267	2	268	5	-----	-----	537	5	540
Elmore	3	1	-----	114,626	1,837	115,901	1	1	-----	70,738	1,115	71,434
Gem	2	-----	-----	197	-----	197	1	-----	-----	53	-----	53
Idaho	19	-----	1	9,105	74	9,157	15	-----	2	9,295	83	9,347
Jerome	1	-----	-----	113	-----	113	2	-----	-----	233	1	234
Latah	1	-----	-----	152	-----	152	2	-----	-----	302	-----	302
Lemhi	8	-----	1	3,031	13	3,040	6	-----	1	2,185	9	2,190
Power	1	-----	-----	156	-----	156	1	-----	-----	172	-----	172
Shoshone	3	1	1	119,197	715	119,694	3	1	-----	46,365	228	46,507
Twin Falls	3	-----	-----	165	-----	165	3	-----	-----	1,116	3	1,118
Valley	3	-----	-----	505	2	506	3	-----	-----	2,243	57	2,278
Washington	3	-----	-----	532	3	534	1	-----	1	607	4	610
	80	2	3	262,386	2,812	264,338	62	3	4	172,826	2,029	174,092

MINING INDUSTRY

General conditions in Idaho in 1926 favored energetic mining, and unusual interest was shown in prospecting and expenditures for development, especially in the southern part of the State. As a result, there was a noticeable increase in the quantity of lead and zinc produced, although the output of the other metals decreased.

Metal prices, however, were not encouraging; the average prices of copper and zinc were slightly less than those of 1925, and the prices of silver and lead, so vital to Idaho, were notably decreased.

The production of gold, which has been rapidly decreasing, was seriously retarded by the closing of the dredge at Murray in May.

The quantity of ore, old tailings, etc., sold or treated in Idaho in 1926 increased 6 per cent over 1925 but was only 70 per cent of that for 1917, the banner year. Of the total, 56 per cent was lead ore, old tailings, and slag and 41 per cent was lead-zinc ore and old tailings; siliceous ore and old tailings represented less than one-half of 1 per cent, copper ore 1.5 per cent, and copper-lead ore 1 per cent. These ores had the following average values in recovered metals per ton: Dry gold ore and old tailings, $12.06; dry gold and silver ore, $103.05; dry silver ore, $17.13; copper ore, $12.82; lead ore, slag, and old tailings, $16.22; copper-lead ore, $15.99; and lead-zinc ore and old tailings, $15.64. The first-class shipping ore—75,295 tons—was largely lead ore; its average recoverable content as shipped is given on page 432. Most of the siliceous ore was treated in amalgamation mills, as shown on page 430, but part of it was concentrated or smelted. The bulk of the copper ore, lead ore, copper-lead ore, and lead-zinc ore was concentrated; the results are presented in the table on pages 431 and 432. The large increase in lead-zinc ore more than offset the decreases in copper ore, lead ore, and siliceous ore.

Ore, old tailings, etc., sold or treated in Idaho, 1917–1926, with content in terms of recovered metals

DRY AND SILICEOUS ORE

Year	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
1917	69, 650	24, 929. 28	81, 514	10, 745	48, 689	-----------
1918	46, 315	14, 253. 45	69, 936	3, 703	8, 470	-----------
1919	48, 251	22, 262. 08	78, 531	11, 976	6, 455	-----------
1920	39, 811	13, 806. 37	91, 752	50, 437	17, 540	-----------
1921	48, 221	13, 826. 54	49, 034	7, 084	16, 942	-----------
1922	25, 766	9, 084. 94	91, 377	19, 252	25, 995	-----------
1923	24, 059	6, 570. 14	67, 294	5, 535	29, 719	-----------
1924	19, 260	5, 808. 43	47, 137	1, 159	3, 086	-----------
1925	18, 135	4, 054. 53	124, 911	51, 041	235, 762	-----------
1926	5, 862	2, 995. 17	24, 335	3, 852	7, 495	-----------

COPPER ORE

Year	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
1917	103, 224	3, 960. 99	232, 840	6, 225, 486	11, 803	-----------
1918	127, 898	3, 339. 71	262, 991	5, 389, 887	-----------	-----------
1919	51, 546	962. 13	246, 983	2, 545, 044	-----------	-----------
1920	19, 259	1, 418. 69	52, 029	1, 738, 541	420	-----------
1921	10, 322	1, 258. 62	23, 987	1, 105, 511	-----------	-----------
1922	32, 590	2, 045. 78	44, 550	2, 572, 335	707	-----------
1923	41, 901	1, 516. 80	74, 247	2, 794, 091	3, 517	-----------
1924	37, 634	2, 407. 47	504, 644	1, 989, 050	131, 204	-----------
1925	51, 004	2, 785. 20	711, 874	2, 738, 861	33, 678	-----------
1926	28, 258	431. 64	429, 343	586, 387	42, 512	-----------

Ore, old tailings, etc., sold or treated in Idaho, 1917–1926, with content in terms of recovered metals—Continued

LEAD ORE

Year	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
1917	1, 448, 285	2, 567. 41	8, 063, 768	1, 250, 215	275, 019, 571	
1918	1, 420, 878	2, 782. 34	8, 036, 861	1, 124, 503	262, 892, 200	
1919	1, 149, 951	1, 970. 50	4, 757, 259	564, 415	160, 572, 291	
1920	1, 480, 177	2, 497. 21	6, 091, 408	657, 627	210, 039, 183	
1921	1, 446, 710	2, 467. 70	5, 688, 577	449, 883	198, 322, 374	
1922	1, 331, 785	2, 590. 10	5, 450, 038	399, 160	193, 551, 305	1, 699, 261
1923	1, 192, 442	2, 066. 00	5, 489, 477	594, 748	191, 685, 757	
1924	1, 254, 212	1, 061. 00	5, 815, 764	672, 154	201, 074, 111	151, 453
1925	1, 088, 564	1, 048. 63	4, 791, 497	272, 978	175, 631, 005	
1926	1, 084, 345	1, 455. 74	4, 575, 490	430, 937	183, 074, 616	

COPPER-LEAD ORE

Year	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
1917	4		803	320	848	
1918	105		1, 706	11, 126	10, 151	
1919	19	0. 58	492	1, 328	5, 604	
1920	5, 015	95. 83	225, 181	69, 791	225, 308	
1921	9, 122	61. 97	317, 244	125, 717	129, 803	
1922	26, 143	1, 635. 00	459, 529	292, 095	333, 045	
1923	52, 291	2, 587. 09	917, 215	546, 343	1, 167, 818	
1924	3, 962	12. 21	140, 423	53, 387	536, 356	
1925	6, 275	26. 31	230, 584	90, 477	1, 233, 092	
1926	22, 037	33. 98	445, 520	116, 124	717, 352	

ZINC ORE, COPPER-ZINC ORE, AND LEAD-ZINC ORE

Year	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
1917	1, 137, 344	933. 16	3, 649, 219	340, 808	118, 478, 610	79, 854, 136
1918	496, 423	251. 89	797, 563	4, 669	31, 785, 172	45, 161, 712
1919	207, 628	79. 97	493, 889		21, 757, 548	15, 994, 229
1920	414, 139	166. 56	865, 305	22, 000	39, 327, 525	27, 932, 326
1921	72					33, 463
1922	20, 600		34, 412		1, 923, 153	2, 409, 870
1923	452, 827	259. 20	1, 118, 813	38, 914	49, 468, 922	27, 952, 749
1924	396, 920	308. 59	1, 280, 938	23, 074	47, 205, 535	15, 189, 045
1925	663, 737	279. 33	1, 881, 761	144, 086	75, 908, 253	31, 237, 240
1926	793, 641	392. 29	2, 079, 727	200, 142	89, 138, 237	52, 614, 691

Ore, old tailings, etc., sold or treated in Idaho, 1925–26, with content in terms of recovered metals

1925

Source	Mines producing	Ore and old tailings		Gold		Silver	
		Short tons	Per cent	Fine ounces	Per cent	Fine ounces	Per cent
Dry gold ore	50	13, 853	0. 76	3, 678. 39	17. 61	5, 303	0. 06
Dry gold and silver ore	6	434	. 02	317. 89	1. 52	7, 515	. 10
Dry silver ore	11	3, 848	. 21	58. 25	. 28	112, 093	1. 45
Copper ore	11	51, 004	2. 79	2, 785. 20	13. 33	711, 874	9. 19
Lead ore	101	[1] 1, 088, 564	59. 56	1, 048. 63	5. 02	4, 791, 497	61. 88
Zinc ore	3	701	. 04	2. 03	. 01	4, 432	. 06
Copper-lead ore	4	6, 275	. 34	26. 31	. 13	230, 584	2. 98
Lead-zinc ore	16	[2] 663, 036	36. 28	277. 30	1. 33	1, 877, 329	24. 24
Total, lode mines	[3] 190	1, 827, 715	100. 00	8, 194. 00	39. 23	7, 740, 627	99. 96
Total, placers	85			12, 692. 92	60. 77	2, 812	. 04
	275	1, 827, 715	100. 00	20, 886. 92	100. 00	7, 743, 439	100. 00

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[1] Includes 31,341 tons of old tailings concentrated and 1,560 tons of old tailings sold to a smelter.

[2] Includes 426 tons of old tailings concentrated.

[3] A mine producing more than one class of ore is counted but once in arriving at total for all classes.

Ore, old tailings, etc., sold or treated in Idaho, 1925–26, with content in terms of recovered metals—Continued

1925—Continued

Source	Copper		Lead		Zinc	
	Pounds	Per cent	Pounds	Per cent	Pounds	Per cent
Dry gold ore	3, 694	0. 11	23, 560	0. 01		
Dry gold and silver ore	89					
Dry silver ore	47, 258	1. 43	212, 202	. 08		
Copper ore	2, 738, 861	83. 06	33, 678	. 01		
Lead ore	272, 978	8. 28	175, 631, 005	69. 41		
Zinc ore			21, 773	. 01	155, 748	0. 50
Copper-lead ore	90, 477	2. 75	1, 233, 092	. 49		
Lead-zinc ore	144, 086	4. 37	75, 886, 480	29. 99	31, 081, 492	99. 50
	3, 297, 443	100. 00	253, 041, 790	100. 00	31, 237, 240	100. 00

1926

Source	Mines producing	Ore, old tailings, etc.		Gold		Silver	
		Short tons	Per cent	Fine ounces	Per cent	Fine ounces	Per cent
Dry gold ore	41	[4] 5, 124	0. 27	2, 811. 27	20. 57	4, 870	0. 06
Dry gold and silver ore	4	44		107. 85	. 79	3, 693	. 05
Dry silver ore	11	694	. 04	76. 05	. 55	15, 772	. 21
Copper ore	11	28, 258	1. 46	431. 64	3. 16	429, 343	5. 68
Lead ore	93	[5] 1, 084, 345	56. 06	1, 455. 74	10. 65	4, 575, 490	60. 55
Copper-lead ore	5	22, 037	1. 14	33. 98	. 25	445, 520	5. 90
Lead-zinc ore	31	[6] 793, 641	41. 03	392. 29	2. 87	2, 079, 727	27. 52
Total, lode mines	[3] 177	1, 934, 143	100. 00	5, 308. 82	38. 84	7, 554, 415	99. 97
Total, placers	69			8, 360. 45	61. 16	2, 029	. 03
	246	1, 934, 143	100. 00	13, 669. 27	100. 00	7, 556, 444	100. 00

Source	Copper		Lead		Zinc	
	Pounds	Per cent	Pounds	Per cent	Pounds	Per cent
Dry gold ore	2, 364	0. 18	4, 185			
Dry gold and silver ore						
Dry silver ore	1, 488	. 11	3, 310			
Copper ore	586, 387	43. 84	42, 512	0. 02		
Lead ore	430, 937	32. 22	183, 074, 616	67. 07		
Copper-lead ore	116, 124	8. 68	717, 352	. 26		
Lead-zinc ore	200, 142	14. 97	89, 138, 237	32. 65	52, 614, 691	100. 00
	1, 337, 442	100. 00	272, 980, 212	100. 00	52, 614, 691	100. 00

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[3] A mine producing more than one class of ore is counted but once in arriving at total for all classes.
[4] Includes 45 tons of old tailings amalgamated.
[5] Includes 52 tons of slag and 3 tons of old tailings sold to a smelter and 30,309 tons of old tailings concentrated.
[6] Includes 3,064 tons of old tailings concentrated.

Value of metals from ore, old tailings, etc., sold or treated in Idaho in 1926, by kinds of ore

Kind of ore	Ore, old tailings, etc. (short tons)	Gold	Silver	Copper	Lead	Zinc	Total
Dry gold ore	5,124	$58,114	$3,039	$331	$335		$61,819
Dry gold and silver ore	44	2,230	2,304				4,534
Dry silver ore	694	1,572	9,842	208	265		11,887
Copper ore	28,258	8,923	267,910	82,094	3,401		362,328
Lead ore	1,084,345	30,093	2,855,106	60,331	14,645,969		17,591,499
Copper-lead ore	22,037	702	278,004	16,258	57,388		352,352
Lead-zinc ore	793,641	8,109	1,297,750	28,020	7,131,059	$3,946,102	12,411,040
	1,934,143	109,743	4,713,955	187,242	21,838,417	3,946,102	30,795,459
Total, 1925	1,827,715	169,385	5,371,995	468,237	22,014,636	2,374,030	30,398,283

GOLD ORE

Most of the gold ore came from the Belshazzar property near Placerville, operated by the Idawa Gold Mining Co., and from the Gold Hill & Iowa property near Quartzburg, both in Boise County. In the past the mines of Elmore, Idaho, Boise, and Lemhi Counties were large producers of gold ore, but the yearly records show a marked decline since 1919. In 1926 gold ore and a small quantity of old tailings yielded $11.34 in gold and 0.95 ounce of silver to the ton; also a small quantity of copper and lead.

GOLD AND SILVER ORE

Four mines in Owyhee County shipped the 44 tons of gold and silver ore; this ore yielded $50.68 in gold and 83.93 ounces of silver to the ton. The main producers were the Happy Boy mine near Grand View and the Trade Dollar property at Silver City.

SILVER ORE

Small lots of silver ore were mined in 1926 at Silver City, Idaho City, Pioneerville, Talache, and Yellow Pine, but most of it came from mines near Grand View in the Castle Creek district, Owyhee County. Bonner County produces also considerable copper ore which is valuable mainly for its silver content. The silver ore of the State as a whole yielded $2.27 in gold and 22.73 ounces of silver to the ton, as well as 0.24 per cent of lead and a small quantity of copper.

COPPER ORE

Copper ore was mined chiefly in Shoshone, Custer, and Bonner Counties, and most of it, or 26,799 tons, was concentrated. Copper ore from Custer and Bonner Counties decreased materially, but there was a notable increase in the copper ore mined in Shoshone County. Considerably less copper ore was mined from the property of the Idaho Metals Co., near Mackay, Custer County, which was for years the largest producer of copper ore in the State. The Crescent and Snow Storm mines in Shoshone County and the Talache property in Bonner County also produced copper ore. The average recovered content of all copper ore shipped or treated was 32 cents in gold and 15.19 ounces of silver to the ton, 1.04 per cent of copper, and a little lead.

LEAD ORE

Most of the lead ore, the most valuable mine product of Idaho since the Coeur d'Alene region became productive, was ore of concentrating grade from Shoshone County. Operators in Lemhi, Boundary, and Custer Counties also mined and shipped much lead ore. The Bunker Hill & Sullivan property at Kellogg in Shoshone County was the leading producer of lead ore, followed by the Hecla mine at Burke and the Gold Hunter mine at Mullan, both also in Shoshone County. The Idaho-Continental mine in Boundary County and the United Idaho property in Lemhi County led the mines in the other counties. Three mines in Idaho produced from lead ore alone 54 per cent of the State's total lead. The average recovered content of all the lead ores, old tailings, and slag in 1926 was 4.22 ounces of silver to the ton, 0.02 per cent of copper, and 8.44 per cent of lead.

COPPER-LEAD ORE

Copper-lead ore increased 15,762 tons in 1926, due chiefly to the fact that ore from the Sunshine (Yankee Boy) property contains more copper than in past years. The ore in the vicinity of Big Creek consists of galena and tetrahedrite, and as the latter increases the silver and copper are correspondingly increased. Most of the ore was concentrated; the total yielded 20.22 ounces of silver to the ton, 0.26 per cent of copper, and 1.63 per cent of lead.

LEAD-ZINC ORE

No zinc ore was sold in 1926. The output of lead-zinc ore increased materially, and nearly all of it was concentrated. The lead-zinc ore and old tailings yielded 2.62 ounces of silver to the ton, 0.01 per cent of copper, 5.62 per cent of lead, and 3.31 per cent of zinc. The output came largely from five mines in Shoshone County, with the Morning mine leading; the gain was due mainly to increased shipments from the Star property in the Hunter district, Shoshone County.

Ore, old tailings, etc., sold or treated in Idaho, 1925–26, by counties, with content in terms of recovered metals

1925

DRY GOLD ORE

County	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Ada	52	26.80	54	159	----------	----------
Boise	9,917	1,660.16	3,874	3,260	11,250	----------
Boundary	1,325	256.46	257	----------	----------	----------
Camas	18	23.64	23	6	314	----------
Custer	26	20.60	36	----------	----------	----------
Elmore	54	53.62	22	----------	----------	----------
Gem	12	9.33	7	----------	----------	----------
Idaho	1,792	1,157.96	758	----------	----------	----------
Lemhi	240	154.30	114	269	11,996	----------
Owyhee	29	44.14	82	----------	----------	----------
Shoshone	52	130.10	17	----------	----------	----------
Valley	36	16.08	7	----------	----------	----------
Washington	300	125.20	52	----------	----------	----------
	13,853	3,678.39	5,303	3,694	23,560	----------

Ore, old tailings, etc., sold or treated in Idaho, 1925–26, by counties, with content in terms of recovered metals—Continued

1925—Continued

DRY SILVER ORE

County	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Blaine	22	4.57	2,860	230	28	-----
Boise	40	1.60	455	-----	-----	-----
Bonner	10	.24	821	83	-----	-----
Owyhee	22	51.00	10,515	34	-----	-----
Shoshone	3,754	.84	97,442	46,911	212,174	-----
	3,848	58.25	112,093	47,258	212,202	-----

COPPER ORE

Bonner	9,206	649.10	385,191	149,230	33,678	-----
Custer	29,758	2,109.03	35,492	2,353,833	-----	-----
Latah	54	1.20	35	12,834	-----	-----
Lemhi	175	14.99	1,945	26,262	-----	-----
Shoshone	11,811	10.88	289,211	196,702	-----	-----
	51,004	2,785.20	711,874	2,738,861	33,678	-----

LEAD ORE

Bannock	4	-----	-----	12	1,424	-----
Bear Lake	6	-----	5	-----	4,749	-----
Blaine	1,700	144.97	109,844	7,497	905,214	-----
Boise	15	24.16	281	63	8,154	-----
Bonner	7,057	43.73	54,704	1,061	270,198	-----
Boundary	26,662	11.53	59,554	-----	3,016,297	-----
Butte	4,048	1.33	8,392	646	1,233,463	-----
Camas	4	2.14	63	26	2,268	-----
Cassia	30	25.05	359	315	22,619	-----
Clark	5	-----	19	-----	1,160	-----
Custer	2,003	26.34	28,140	5,154	835,804	-----
Lemhi	11,675	338.23	92,619	24,997	3,718,915	-----
Shoshone	[1] 1,035,355	431.15	4,437,517	233,207	165,610,740	-----
	1,088,564	1,048.63	4,791,497	272,978	175,631,005	-----

LEAD-ZINC ORE

Blaine	86	3.48	2,168	462	12,558	27,514
Bonner	23	-----	117	-----	6,363	5,630
Shoshone	[2] 662,927	273.82	1,875,044	143,624	75,867,559	31,048,348
	663,036	277.30	1,877,329	144,086	75,886,480	31,081,492

1926

DRY GOLD ORE

Ada	1	0.59	-----	-----	-----	-----
Boise	3,711	1,995.70	4,058	2,345	4,086	-----
Bonneville	2	1.38	-----	-----	-----	-----
Camas	15	19.50	6	-----	-----	-----
Custer	1	5.64	6	-----	-----	-----
Elmore	183	144.55	75	-----	-----	-----
Gem	1	1.49	1	-----	-----	-----
Idaho	342	210.11	140	-----	-----	-----
Lemhi	[3] 58	39.08	230	-----	-----	-----
Owyhee	18	25.41	98	-----	-----	-----
Shoshone	50	93.15	16	-----	-----	-----
Valley	740	273.33	240	19	99	-----
Washington	2	1.34	-----	-----	-----	-----
	5,124	2,811.27	4,870	2,364	4,185	-----

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[1] Includes 31,341 tons of old tailings concentrated and 1,560 tons of old tailings sold to a smelter.

[2] Includes 426 tons of old tailings concentrated.

[3] Includes 45 tons of old tailings amalgamated.

Ore, old tailings, etc., sold or treated in Idaho, 1925–26, by counties, with content in terms of recovered metals—Continued

1926—Continued

DRY SILVER ORE

County	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Boise	8	11. 57	1, 430	28	282	
Bonner	39	5. 10	3, 565	1, 195		
Lemhi	1	. 67	49			
Owyhee	559	56. 82	10, 057	265	3, 028	
Valley	87	1. 89	671			
	694	76. 05	15, 772	1, 488	3, 310	
COPPER ORE						
Bonner	2, 107	160. 00	90, 838	37, 144	12	
Butte	3		122	571		
Custer	3, 635	234. 38	6, 453	239, 785		
Lemhi	235	22. 98	335	17, 796		
Shoshone	22, 278	14. 28	331, 595	291, 091	42, 500	
	28, 258	431. 64	429, 343	586, 387	42, 512	
LEAD ORE						
Bear Lake	1		1		735	
Blaine	[4] 961	49. 03	64, 242	5, 507	569, 245	
Boise	1, 840	149. 61	2, 700	687	77, 671	
Bonner	1, 722	2. 84	48, 620	1, 109	967, 456	
Boundary	23, 572		58, 677	2, 518	3, 193, 885	
Butte	1, 775	2. 15	6, 766	772	522, 529	
Cassia	43	26. 70	393	551	29, 284	
Clark	130	. 10	196		41, 553	
Custer	17, 334	82. 92	98, 751	11, 191	3, 762, 213	
Kootenai	3		11		685	
Lemhi	[5] 23, 832	469. 26	158, 161	41, 359	5, 865, 247	
Shoshone	[6] 1, 013, 132	673. 13	4, 136, 972	367, 243	168, 044, 113	
	1, 084, 345	1, 455. 74	4, 575, 490	430, 937	183, 074, 616	
COPPER-LEAD ORE						
Butte	3		70	294	981	
Custer	133	1. 89	36, 110	10, 385	88, 226	
Shoshone	21, 901	32. 09	409, 340	105, 445	628, 145	
	22, 037	33. 98	445, 520	116, 124	717, 352	
LEAD-ZINC ORE						
Blaine	20	0. 55	1, 013	66	11, 347	3, 838
Custer	436	6. 15	4, 791	1, 408	164, 901	67, 730
Lemhi	27				8, 761	9, 638
Shoshone	[7] 793, 158	385. 59	2, 073, 923	198, 668	88, 953, 228	52, 533, 485
	793, 641	392. 29	2, 079, 727	200, 142	89, 138, 237	52, 614, 691

[4] Includes 23 tons of slag sold to a smelter.

[5] Includes 29 tons of slag sold to a smelter.

[6] Includes 30,309 tons of old tailings concentrated and 3 tons of old tailings sold to a smelter.

[7] Includes 3,064 tons of old tailings concentrated.

The accompanying table gives the kind and grade of zinc material marketed in 1925 and 1926:

Zinc ore, lead-zinc ore, and zinc and lead-zinc concentrates (as marketed from Idaho mines and mills) sold to smelters, 1925–26

Classification	County	Quantity (dry weight)	Gross zinc	Average assay of ore or concentrate	Recovered zinc
1925		*Short tons*	*Pounds*	*Per cent*	*Pounds*
Oxidized zinc ore	Lemhi	41	18, 352	22. 38	14, 682
Sulphide zinc ore	Shoshone	260	125, 517	24. 14	106, 689
Oxidized lead-zinc ore	Blaine	28	22, 999	41. 07	19, 549
Sulphide lead-zinc ore	Shoshone	94	64, 884	34. 51	55, 151
Zinc and lead-zinc concentrates.	Blaine, Bonner, Shoshone, and Adams.	42, 286	36, 809, 429	43. 52	31, 041, 169
		42, 709	37, 041, 181	43. 36	31, 237, 240
1926					
Oxidized lead-zinc ore	Lemhi	27	12, 351	22. 87	9, 638
Sulphide lead-zinc ore	Shoshone	96	25, 748	13. 41	20, 856
Zinc and lead-zinc concentrates.	Blaine, Custer, and Shoshone.	68, 212	63, 409, 416	46. 48	52, 584, 197
		68, 335	63, 447, 515	46. 42	52, 614, 691

METALLURGIC INDUSTRY

In the past much of the ore mined in Idaho was treated by amalgamation or cyanidation, but in 1926 no ore was treated by cyanidation and the quantity amalgamated was not large. The general tendency seems to be toward concentrating and smelting. More than four-fifths of the value of the output of the State in 1926 was from concentrates, and most of the remainder was from crude smelting ore. Marked progress was made in metallurgy, especially in the treatment of lead-zinc ore by flotation, and several new mills were under construction and others were adding flotation equipment or being changed to regular flotation plants; work at the Morning, Sweeny, Page, Constitution, Galena, Hecla, Jack Waite, Oregon-Idaho, and Lincoln plants was noteworthy. The marketing of zinc concentrate was facilitated by agreements made with a Belgian smelting company, but these contracts will expire in 1927. In July, however, excavations were started for the new electrolytic zinc plant to be erected south of the Bunker Hill smelter, near Bradley.

In Idaho 57 milling plants of all kinds were active in 1926, against 52 in 1925. Of these mills 39 were concentration plants, 16 of which used flotation machines with other concentrating devices, 14 used flotation alone, and 9 used crushers, jigs, and tables, without flotation cells; 15 used amalgamation alone; and 3 used amalgamation with concentration tables. A list of the ore-milling plants, with their general features, in Idaho in 1925, prepared by the Bureau of Mines, may be had upon request.

In 1926, less than one-half of 1 per cent of the total ore, etc., or 4,499 tons of ore and 45 tons of old tailings, was treated in gold and silver mills, all by amalgamation; the gold and silver recovered were valued at $42,543, or $9.36 per ton of material treated. The companies purchased 313 pounds of quicksilver in 1926, an average of

0.0689 pound per ton of ore and old tailings amalgamated and 0.1059 pound per ounce of gold and silver bullion saved.

Of the total ore, old tailings, etc., 96 per cent was concentrated. Metals recovered from the concentrates—from ore concentrated, from 33,373 tons of old tailings re-treated, and from part of the ore treated in gold and silver (amalgamation) mills—were valued at $88.15 a ton, against $96.88 in 1925. The concentrates came largely from the Coeur d'Alene region, where the ratio was 6.27 tons of ore and old tailings to 1 ton of concentrate. The large increase in zinc concentrate more than offset the decreases in lead-zinc concentrate and copper concentrate. Operators in Shoshone County shipped an average of 23,818 tons of concentrates of various kinds a month, against 21,265 tons in 1925. This amount, with the crude ore shipped (4,885 tons a month), gives the Coeur d'Alene region an average monthly output of 28,703 tons of concentrates and crude ore, against 25,572 tons in 1925. The average value of metals recovered from lead concentrates declined from $99.70 to $91.59 a ton and that from zinc concentrate from $70.80 to $68.24, but that from lead-zinc concentrate rose from $74.06 to $80.11. The average value of the copper concentrate and the copper-lead concentrate increased considerably. Both contained much silver.

Of the total ore 4 per cent was shipped crude to smelters at Bradley, Idaho; East Helena and Anaconda, Mont.; Tacoma, Wash.; Coffeyville, Kans.; and plants near Salt Lake City, Utah. The total value of the metals recovered from first-class ore was $4,879,793, as compared with $4,441,749 in 1925. Of the crude ore shipped to smelters 97 per cent was lead ore; the remainder was largely copper ore. Most of the ore smelted was sulphide, though 21 per cent of the lead ore was carbonate. The combined value of the metals from concentrates and crude shipping ore was $30,751,277, compared with $30,327,949 in 1925.

Miscellaneous material other than ore and old tailings milled or smelted was insignificant, and no ore was treated locally by either leaching or roasting methods.

Mine production of metals from gold and silver (amalgamation) mills in Idaho in 1926, by counties [1]

County	Ore and old tailings treated		Recovered in bullion by amalgamation		
	Ore	Old tailings	Gold	Silver	Total value
	Short tons	*Short tons*	*Fine ounces*	*Fine ounces*	
Ada	1		0.59		$12
Boise	3,132		1,326.01	427	27,678
Bonneville	2		1.38		29
Camas	15		19.50	6	407
Elmore	167		98.25	47	2,060
Idaho	342		210.11	140	4,430
Lemhi	12	45	20.15	5	420
Owyhee	36		30.58	106	698
Shoshone	50		93.15	16	1,936
Valley	740		229.03	178	4,845
Washington	2		1.34		28
	4,499	45	2,030.09	925	42,543
Total, 1925 [1]	4,512		2,431.28	1,932	51,600

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[1] No cyanidation mills were operated in 1926. Ore cyanided in 1925 amounted to 1,377 tons and yielded 267.39 ounces of gold and 719 ounces of silver, valued together at $6,026.

Mine production of metals from gold and silver (amalgamation) mills in Idaho in 1926, by counties—Continued

County	Concentrates and recovered metal					
	Concentrates produced	Gold	Silver	Copper	Lead	Total value of metal
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	
Boise	114	189. 39	1, 503	581	210	$4, 951
Owyhee	1	22. 30	1, 571			1, 441
Valley	10	44. 30	62	19	99	966
	125	255. 99	3, 136	600	309	7, 358
Total, 1925	18	55. 62	850	269	11, 996	2, 822

Mine production of metals from concentrating mills in Idaho in 1926, by counties

County	Ore and old tailings treated		Concentrates and recovered metal						
	Ore	Old tailings	Concentrates produced	Gold	Silver	Copper	Lead	Zinc	Total value of metal
	Short tons	*Short tons*	*Short tons*	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*	
Blaine	170		45	1. 35	2, 293	392	32, 347	3, 838	$4, 390
Boise	2, 397		255	576. 20	4, 714	2, 226	80, 999		21, 643
Bonner	2, 660		382	160. 89	94, 376	35, 120	79, 360		73, 483
Boundary	23, 572		2, 506		58, 677	2, 518	3, 193, 885		292, 477
Butte	1, 740		480	. 27	4, 321	500	512, 261		43, 753
Clark	100		25		110		26, 297		2, 173
Custer	17, 426		2, 939	208. 86	64, 210	129, 051	2, 409, 140	67, 730	260, 262
Lemhi	13, 784		888	46. 91	20, 567	10, 693	365, 373		44, 531
Owyhee	550		35	2. 49	5, 550	265	3, 028		3, 793
Shoshone	1, 758, 477	33, 373	285, 819	955. 38	5, 879, 726	861, 842	217,122,732	52,512,629	25, 117, 621
	1, 820, 876	33, 373	293, 374	1, 952. 35	6, 134, 544	1, 042, 607	223,825,422	52,584,197	25, 864, 126
Total, 1925	1, 725, 155	31, 767	267, 169	4, 393. 60	6, 376, 271	2, 845, 355	213,841,983	31,041,169	25, 883, 378

Mine production of metals from Idaho concentrates in 1926

BY COUNTIES

	Concentrates	Gold	Silver	Copper	Lead	Zinc	Total value of metal
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*	
Blaine	45	1. 35	2, 293	392	32, 347	3, 838	$4, 390
Boise	369	765. 59	6, 217	2, 807	81, 209		26, 594
Bonner	382	160. 89	94, 376	35, 120	79, 360		73, 483
Boundary	2, 506		58, 677	2, 518	3, 193, 885		292, 477
Butte	480	. 27	4, 321	500	512, 261		43, 753
Clark	25		110		26, 297		2, 173
Custer	2, 939	208. 86	64, 210	129, 051	2, 409, 140	67, 730	260, 262
Lemhi	888	46. 91	20, 567	10, 693	365, 373		44, 531
Owyhee	36	24. 79	7, 121	265	3, 028		5, 234
Shoshone	285, 819	955. 38	5, 879, 726	861, 842	217, 122, 732	52, 512, 629	25, 117, 621
Valley	10	44. 30	62	19	99		966
	293, 499	2, 208. 34	6, 137, 680	1, 043, 207	223, 825, 731	52, 584, 197	25, 871, 484
Total, 1925	267, 187	4, 449. 22	6, 377, 121	2, 845, 624	213, 853, 979	31, 041, 169	25, 886, 200

Mine production of metals from Idaho concentrates in 1926—Continued

BY KINDS OF CONCENTRATES

	Concentrates	Gold	Silver	Copper	Lead	Zinc	Total value of metal
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*	
Dry and siliceous	299	685.07	10,700	2,404	6,665		$21,707
Copper	1,470	329.76	424,086	455,636	42,512		338,636
Lead	222,449	821.69	4,949,357	354,904	215,227,799		20,373,296
Zinc	53,624	135.38	219,841	99,465	4,274,593	42,177,091	3,659,153
Copper-lead	1,069	28.19	401,272	99,406	563,865		310,003
Lead-zinc	14,588	208.25	132,424	31,392	3,710,297	10,407,106	1,168,689

AVERAGE RECOVERABLE CONTENT

	Short tons	*Fine ounces per ton*	*Fine ounces per ton*	*Per cent*	*Per cent*	*Per cent*	*Value per ton*
Dry and siliceous	299	2.29	35.79	0.40	1.11		$72.60
Copper	1,470	.22	288.49	15.50	1.45		230.36
Lead	222,449		22.25	.08	48.38		91.59
Zinc	53,624		4.10	.09	3.99	39.33	68.24
Copper-lead	1,069	.03	375.37	4.65	26.37		289.99
Lead-zinc	14,588	.01	9.08	.11	12.72	35.67	80.11
	293,499	.01	20.91	.18	38.13	8.96	88.15
Total, 1925	267,187	.02	23.87	.53	40.02	5.81	96.88

Mine production of metals from Idaho crude ore shipped to smelters in 1926

BY COUNTIES

	Ore	Gold	Silver	Copper	Lead	Zinc	Total value of metal
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*	
Bear Lake	1		1		735		$60
Blaine	788	46.50	62,314	5,038	543,148		84,002
Boise	30	65.28	1,544	253	830		2,413
Bonner	1,208	7.05	48,647	4,328	888,108		102,156
Butte	41	1.88	2,637	1,137	11,249		2,743
Cassia	43	26.70	393	551	29,284		3,217
Clark	30	.10	86		15,256		1,276
Custer	4,113	122.12	81,901	133,718	1,606,200		200,847
Elmore	16	46.30	28				974
Gem	1	1.49	1				32
Kootenai	3		11		685		62
Lemhi	10,283	464.93	138,143	48,402	5,502,635	9,638	543,522
Owyhee	35	134.72	6,621				6,917
Shoshone	58,616	149.71	1,072,026	100,605	40,542,823	20,856	3,931,114
Valley	87	1.89	671				458
	75,295	1,068.67	1,415,024	294,032	49,140,953	30,494	4,879,793
Total, 1925	63,344	1,046.09	1,357,337	451,819	39,069,804	196,071	4,441,749

BY KINDS OF ORE

Dry and siliceous	211	280.02	12,710	1,448	830		$13,988
Copper	1,459	101.88	5,257	130,751			23,691
Lead	73,265	680.02	1,351,909	145,115	48,951,343		4,794,072
Copper-lead	237	5.79	44,248	16,718	153,487		42,350
Lead-zinc	123	.96	900		35,293	30,494	5,692

AVERAGE RECOVERABLE CONTENT

	Short tons	*Fine ounces per ton*	*Fine ounces per ton*	*Per cent*	*Per cent*	*Per cent*	*Value per ton*
Dry and siliceous	211	1.33	60.24	0.34	0.20		$66.29
Copper:							
Oxidized	1,046	.06	3.70	4.27			15.41
Sulphide	413	.10	3.36	5.02			18.32
Lead:							
Oxidized	15,301	.03	13.86	.24	21.06		43.60
Sulphide	57,964		19.67	.06	36.67		71.20
Copper-lead: Sulphide	237	.02	186.70	3.53	32.38		178.69
Lead-zinc:							
Oxidized	27				16.22	17.85	52.74
Sulphide	96	.01	9.38		13.82	10.86	44.46
	75,295	.01	18.79	.20	32.63	.02	64.81
Total, 1925	63,344	.02	21.43	.36	30.84	.15	70.12

REVIEW BY COUNTIES AND DISTRICTS

The report [2] of the mine inspector of Idaho contains notes on the progress of the mining industry, lists the active companies, and gives an interesting bibliography for each county.

ADA COUNTY

Black Hornet district.—A small quantity of placer gold was recovered near Boise, but the lode mines of the Black Hornet district were not active.

ADAMS COUNTY

Seven Devils district.—The Idaho Copper Co., owning the Red Ledge group, extensively developed by tunnels and diamond-drill work, did some road building and started a long adit from Eagle Bar.

BEAR LAKE COUNTY

Bear Lake district.—A test lot of lead ore was shipped from the old Boulder group, operated by the Utah-Idaho Mining & Milling Co.

Pegram district.—The Colossus Mining & Milling Co., which has a partly completed cyanidation mill, did a little development work.

BLAINE COUNTY

The value of the mine production of metals in Blaine County decreased $77,141 in 1926, due chiefly to the large decreases in the output of silver and lead from the Independence property of the Federal Mining & Smelting Co. From 1880 to 1926 Blaine County has produced $2,563,821 in gold, $16,367,596 in silver, $66,398 in copper, $9,004,533 in lead, and $652,751 in zinc, a total of $28,655,099. The quantities of the various metals follow: Gold, 124,026.59 fine ounces; silver, 17,942,261 fine ounces; copper, 382,259 pounds; lead, 200,898,173 pounds; and zinc, 8,058,712 pounds.

Little Wood River district (*Muldoon*).—Silver-lead ore was opened at the Porto Rico and Keystone groups, which are being developed by several tunnels.

Mineral Hill district (*Hailey*).—Twelve lode mines in the Mineral Hill district produced 366 tons of ore, yielding $157 in gold, 26,714 ounces of silver, 2,560 pounds of copper, 282,043 pounds of lead, and 3,838 pounds of zinc, valued in all at $40,035, or $109.39 in metals a ton. There was a slight increase in the output of ore, most of which was first-class lead ore. The largest production was that of the Star mine, which was operated under lease. A few hundred tons of lead ore was shipped to Salt Lake City, Utah, for smelting, and a little lead-zinc ore was tested at a custom flotation plant. Small lots of ore were shipped from the Bellmont, Ivanhoe, Lark, Minnie Moore, St. Idloes, Wonder, and Queen of the Hills properties. Although 1,500 feet of development was done at the Minnie Moore mine by the Minnie Moore Syndicate, controlled by the Hecla Mining Co., no commercial ore was found and the property was returned to the Minnie Moore Mines Co.

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[2] Campbell, Stewart, Twenty-Eighth Annual Report of the Mining Industry of Idaho, for 1926.

Sawtooth district.—The shaft of the Silver King mine, a producer in the early nineties, was unwatered and work in several levels exposed considerable silver ore.

Warm Springs district (*Ketchum*).—Eight lode mines in the Warm Springs district produced 615 tons of ore and old slag, yielding $868 in gold, 38,541 ounces of silver, 3,013 pounds of copper, and 298,549 pounds of lead, valued in all at $49,224, or $80.04 in metals a ton. Most of the output was first-class silver-lead ore produced by lessees at the Independence mine of the Federal Mining & Smelting Co. The property is equipped with a 500-ton flotation mill, which was idle. According to the Federal Mining & Smelting Co.'s annual report to stockholders, lessees on the Independence mine paid $6,835 in royalties and the ore contained 34.42 ounces of gold, 32,817 ounces of silver, and 236,000 pounds of lead. Several lots of lead ore and concentrate were shipped from the Hailey Bonanza property, which is equipped with a 100-ton concentration plant. The mill, however, was operated only a short time on account of the shortage of water. Several thousand tons of ore containing 40 ounces of silver to the ton and 20 per cent of lead is said to be in reserve. Small lots of lead ore were also shipped from the Chloride Point, Lone Pine, West Fork, and Silver Crown properties, and a car of slag containing gold, silver, and lead was shipped from Ketchum.

BOISE COUNTY

The value of the mine production of metals in Boise County increased from $51,950 in 1925 to $94,198 in 1926. The placer production was valued at $37,512, an increase of $25,772, which was due to the operation of the new dredge at Centerville by the Gold Dredging & Power Corporation.

Bodie district.—A milling test was made of the low-grade gold ore from the Lost mine, which is equipped with a 10-stamp mill.

Boise Basin district (*Centerville, Placerville, Idaho City, Pioneerville*).—Eight placers and 10 lode mines in the Boise Basin district produced 5,524 tons of ore, $81,612 in gold, 8,556 ounces of silver, 3,060 pounds of copper, and 82,039 pounds of lead, valued in all at $93,942. The ore had an average value of $10.22 in metals a ton. The placer output consisted of $37,176 in gold and 514 ounces of silver, valued together at $37,497. The Belshazzar mine, operated by the Idawa Gold Mining Co., produced considerable ore, which was treated by amalgamation and concentration. The mill, which has a capacity of 25 tons a day, is equipped with crusher, rolls, Hardinge ball mill, Wilfley tables, and amalgamating plates. The concentrate from the Wilfley tables is reground in a small arrastre, after which it is amalgamated. The Golden Age Junior mine at Pioneerville produced ore of milling grade, from which several lots of rich gold concentrate were shipped. Bullion was marketed from the Gold Hill & Iowa property as a result of cleaning up the mill. The mine, which was a large producer of gold from 1911 to 1924, and especially from 1919 to 1921, was allowed to fill with water; however, plans were made to resume work early in 1927. The 100-ton concentration-flotation plant of the Mineral Mining Co., operating the Smuggler and Big Enterprise groups, was completed late in the year. Several cars of lead concentrate rich in gold were shipped to Utah for smelting. Other small producers were the Come Back, Hay Fork, Mascot, and Wine Cup properties. The placer output of the district was more than that of 1925, but small when compared with past years. New dredge operations were conducted by the Gold Dredging & Power Corporation on Grimes Creek near Centerville. The plant was operated by steam power and had a capacity of 2,500 cubic yards per day. It treated 483,000 cubic yards of gravel from June 1 to December 14, and early in 1927 electric power was being installed. Next in importance in placer output was the Boise Placer Co., which treated bench gravel by hydraulicking. Some gold was also recovered from the Gold Eagle claim by the National Hydraulic Mines Co., which controls 1,400 acres of placer ground on Moore's Creek.

BONNER COUNTY

The value of the mine production of metals in Bonner County decreased $193,399 in 1926, although there was a large increase in the lead output. The value of the silver output decreased $216,692, as a result of the closing of the property of the Talache Mines (Inc.), and there was also a large decrease in copper. Shipments of lead ore from the property of the Whitedelf Mining & Development Co., near Clark Fork, increased the output of lead.

Lakeview district.—Work was continued at the two-compartment shaft of the Idaho Hewer Mines (Inc.), and silver ore was cut at several points in the crosscut from the 500-foot level. Only one car of lead concentrate was shipped, as the only ore milled was that mined during development. The chief minerals are galena, sphalerite, pyrite, siderite, and tetrahedrite.

Pend d'Oreille district.—Six lode mines in the Pend d'Oreille district produced 3,468 tons of ore, yielding $3,433 in gold, 140,163 ounces of silver, 39,232 pounds of copper, and 962,956 pounds of lead, valued in all at $173,424, or $50.01 in metals a ton. About one-third of the output was first-class lead ore, and the remainder was ore of concentrating grade. The metal output of the district decreased from $326,659 in 1925, as the 150-ton flotation plant at the Talache mine was idle after July. Several hundred tons of copper concentrate, rich in silver, was shipped to Tacoma, Wash., but development was disappointing and the mine was closed in November after doing 1,000 feet of drifts, raises, and shaft work. The most interesting new discovery was that of the Whitedelf property, from which, after slight development, about 1,000 tons of silver-lead ore was shipped through the work of lessees. The mine is owned by the Whitedelf Mining & Development Co. and is said to have about 100,000 tons of sulphide lead ore in reserve. Several cars of rich lead ore were shipped from the Elsie K. property, and the Lawrence group produced several cars of concentrate and crude ore. The latter property is equipped with a 50-ton concentrator which was operated intermittently. The Copper Giant mine produced a test lot of copper ore and the Black Tail property one lot of rich silver ore.

BONNEVILLE COUNTY

Mount Pisgah district.—With the exception of a small sample lot of gold ore from the Queen & Paymaster mine, the output of the Mount Pisgah district which was valued at $801 was mainly placer gold from Caribou Mountain near Gray.

BOUNDARY COUNTY

The value of the mine production of metals in Boundary County declined $16,990 in 1926, due to the decrease in the average price of lead. The quantity of lead increased 177,588 pounds, but there was a decrease in silver and no gold was produced in 1926.

Moyie Yahk district.—No output was reported from property in the Purcell Range, but a little development was done on lode claims at the Cynide and Leonia mines.

Port Hill district (*Klockmann*).—The Idaho-Continental mine was operated by lessees on a one-shift basis, and about 23,000 tons of silver-lead ore was treated in the 200-ton wet concentration plant. More than 3,000,000 pounds of lead was recovered from silver-lead concentrate shipped to Bradley, and more than 800 feet of development was done during the year. The mine has been a large producer of silver and lead since 1915. Conditions at the property were fully described in a bulletin[3] published in 1926, which also gave in detail the geology and ore deposits of Boundary County.

BUTTE COUNTY

The mine production of metals in Butte County in 1926 was valued at $46,496, a decrease of $66,758 from 1925, due to curtailment of shipments of lead concentrate from the Wilbert mine near Howe.

Antelope district.—One lot of silver-lead ore was shipped from the Henderson property near Moore.

Dome district.—Practically all the output of the Dome district was that of the Wilbert mine. A 60-ton wet concentration mill was operated on silver-lead ore, and 500 feet of development was done.

Hamilton district.—Development was continued at the Badger property near Howe, and a 25-ton concentration mill was operated a short time. One car of lead concentrate was shipped to Salt Lake City, Utah, for smelting.

Lava Creek district.—Three lode mines in the Lava Creek district produced 20 tons of ore, yielding $37 in gold, 1,425 ounces of silver, 547 pounds of copper, and 7,973 pounds of lead, valued in all at $1,640, or $82 in metals a ton. Small lots of lead ore were shipped from the Martin, St. Louis, and Dahle claims. A body of first-class lead ore and mill ore was opened at the Martin property on Little Fall Creek.

CAMAS COUNTY

Skeleton Creek district.—A 5-ton Gibson mill was operated a short time on gold ore from the Snowslide & Remington property near Fairfield. A small quantity of placer gold was marketed from the Axolotl claim.

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[3] Kirkham, V. R. D., and Ellis, E. W., Geology and Ore Deposits of Boundary County, Idaho: Idaho Bur. Mines and Geol. Bull. 10, 1926.

CASSIA COUNTY

Stokes district.—The Melcher mine, an old producer of lead ore, was operated by lessees, who shipped two cars of ore to Salt Lake City, Utah, for smelting; about $2,000 was expended on development. The Clark Mining & Leasing Co. operated property near Declo and shipped a sample lot of lead ore.

CLARK COUNTY

Birch Creek district.—The Idaho Lead Mines Co., operating the Scott mine as lessee, built a 50-ton concentration plant and did considerable work underground. A few cars of first-class lead ore and concentrate were shipped to Salt Lake City, Utah, for smelting.

CLEARWATER COUNTY

Burnt Creek district.—A little placer gold was saved from the Independence claim at Dent.

Moose Creek district.—A little gold was saved from hydraulicking stream gravel on Independence and Moose Creeks by the Independence Placer Mining Co. The chief work of the year was installing pipe and digging ditches.

Pierce district.—Placer gold was shipped to the assay office at Boise, Idaho, and to the mint at San Francisco, Calif., from the Hay Creek and other claims at Pierce. From 1911 to 1917 the district was an important producer of gold, partly through dredge operations, but in recent years production has been small. Renewed interest was awakened by the construction work done by the Northern Pacific Railroad on the branch line from Orofino to Pierce.

CUSTER COUNTY

The value of the mine production of metals in Custer County decreased from $776,995 in 1925 to $461,650 in 1926. There was a large decrease in the output of copper, gold, and silver, but the lead output increased nearly 2,000,000 pounds as a result of the large shipments of lead ore and concentrate from the Livingston mine south of Clayton.

Alder Creek district (*Mackay*).—Three lode mines in the Alder Creek district produced 4,741 tons of ore, yielding $5,125 in gold, 18,761 ounces of silver, 243,816 pounds of copper, 383,130 pounds of lead, and 18,942 pounds of zinc, valued in all at $83,037, or $17.51 in metals a ton. About half the ore was first-class shipping ore and the remainder was of milling grade. The Empire mine of the Idaho Metals Co., the largest producer of copper in Idaho in 1925, was active only six months in 1926. The property is equipped with a 200-ton flotation plant, and both crude copper ore and copper concentrates were shipped to International, Utah, for smelting. Several cars of oxidized lead ore were shipped from the White Knob mine, under control of the United States Smelting, Refining & Mining Co. Nearly 1,000 tons of silver-lead ore was shipped from the Horseshoe mine of the Kay Development Co., where a large deposit of ore was said to have been opened during the year. Some lead-zinc ore also was shipped to a custom flotation plant for testing.

Alto district.—A test lot of lead-zinc ore was shipped from the Phi Kappa property; considerable ore of good grade was discovered at this property early in 1927.

Bay Horse district.—One placer mine and four lode mines in the Bay Horse district produced 548 tons of ore, $137 in gold, 40,288 ounces of silver, 11,256 pounds of copper, and 142,719 pounds of lead, valued in all at $38,270. The ore was valued at $69.73 in metals a ton. The property of the Ramshorn Mines Co., formerly a large producer of silver and lead, was not operated on company account, but several cars of sulphide copper-lead ore were shipped to Midvale, Utah, by lessees. About 400 tons of lead ore was milled at the Grizzly property, where a small concentrating plant consisting of hand jigs operated three months. The property is said to have 2,000 tons of ore in reserve, assaying 12 per cent of lead and 21 ounces of silver to the ton. Small lots of first-class lead ore were shipped from the Deltafee and Last Chance claims. A little placer gold was saved by sluicing bench gravel at the Ideal placer, 14 miles above Clayton.

Boulder district.—The Livingston mine, owned by the Livingston Mines Corporation, on Railroad Ridge south of Mackay, was a large producer of silver and lead from crude ore and concentrates shipped to Salt Lake City, Utah. The mine and mill were operated continuously, and more than 3,000 feet of development was done in crosscuts, drifts, and raises. The mill is equipped with crusher, rolls, tables, ball mills, and flotation unit. The ore, which is mostly sulphide, contains galena, jamesonite, sphalerite, pyrite, and stibnite. An article [1] describing the property appeared in May.

Loon Creek district.—A little placer gold was recovered from claims on Loon Creek, near Stanley.

Sea Foam district.—Development was done by the Seafoam Mines Corporation, and the Burns Mining & Milling Co. opened silver-lead ore of good grade.

Yankee Fork district.—Placer gold was recovered from the Rough Creek claims, and development was done at the Why Not group by the MacGinnis-Walker Metals Co.

ELMORE COUNTY

Dredge operations near Featherville resulted in a large output, mainly gold, but the total value of the metal output for the county was 36 per cent less than in 1925. Late in the year development was continued at the Franklin mine in the Pine Grove district and at some of the old producing mines at Atlanta, but no output was reported.

Bear Creek district (Featherville).—One of the largest placer operations in Idaho was that of the South Park Dredging Co., which has operated an electric dredge near Featherville since 1922. The plant is equipped with sixty 9-cubic foot buckets and treated 665,000 cubic yards of gravel, but it was active only half the year. One car of rich gold ore was shipped from the West Ophir group of the Apex Gold Mining Co. (Inc.).

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[1] Stewart, J. B., "The Livingston mine, Custer County, Idaho": Min. and Met., vol. 7, May, 1926, p. 223.

Black Warrior district.—The Overlook group was operated by the White Eagle Mining Co., which treated gold ore in a 5-stamp amalgamation mill. The Black Warrior group of placer claims was leased to the La Trinidad Mining Co.

Middle Boise district (*Atlanta*).—The Rose placer, 64 miles from Boise on the Middle Fork of Boise River, was active a short time in May, and the Winner group produced a little bullion by operating a 5-ton Ellis ball mill and Ellis electric amalgamator. It was reported that the St. Joseph Lead Co. planned consolidation of the Monarch and Boise Rochester properties, large producers of gold and silver in the past.

Pine Grove district.—A small mill was erected at the Objective claim near Pine, and a little gold bullion was recovered by amalgamation. About 2,000 tons of $25 gold ore is said to be in reserve. A little ore from the Last Chance mine was also treated by amalgamation in a 5-stamp mill. Development was continued at the Franklin mine, a former producer of gold.

GEM COUNTY

West View district.—The output of the district, unusually small in 1926, consisted of a little placer gold from the Pearl Mountain property and sample lots of gold ore. The Lincoln mine at Pearl was operated from July to December by the Lincoln Mine Operating Co. In October reconstruction of the mill began. When completed the plant will have a capacity of 100 tons and will consist of a Marcy ball mill, Dorr and Fahrenwald classifiers, McIntosh flotation cells, Wilfley tables, Dorr thickener, and Portland filter. The ore, of which there is a large reserve, is an arsenical sulphide. The mine was a large producer of gold and silver, recovered by cyanidation, from 1904 to 1909, when the West View district was part of Boise County.

IDAHO COUNTY

The mine production of metals in Idaho County was valued at $13,777 in 1926, a decrease of $19,843 from 1925, and a small output compared with that of 20 years ago. The Unity Gold Mines Co., at Warren, a large producer of gold in recent years, suspended operations early in 1926. The mines at Elk City, Orogrande, Buffalo Hump, and Dixie were not productive. The geology of the region, the conditions at the mines, and the difficulties resulting from the lack of adequate transportation from Stites or Grangeville were described at length in a bulletin [5] issued in 1924.

Camp Howard district.—A little placer gold was recovered from the Klondike and other claims near White Bird.

Dixie district.—A little placer gold was saved from the Jackson claim on Salmon River.

Elk City district.—Three placer mines in the Elk City district produced $399 in gold and 3 ounces of silver. The Red Horse placer on Red Horse Creek and the Relief placer south of Elk City were the chief producers. Development was started in October at the American Eagle mine, which is equipped with a 10-stamp mill.

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[5] Thomson, F. A., and Ballard, S. M., Geology and Gold Resources of North Central Idaho: Idaho Bur. Mines and Geol. Bull. 7, 1924.

Florence district.—Three placers and one lode mine in the Florence district produced gold and silver valued at $300. A little gold ore was treated by amalgamation at the Mikado claim, and placer gold was recovered from the American Boy, Black Sand, and Syringa Rex properties. The last named was being prospected by the Submarine Gold Placer & Quartz Mining Co. (Inc.).

Marshall Lake district.—A little gold ore from the Leadville property near Burgdorf was treated in a 2-stamp amalgamation mill.

Newsome district.—At the Moose Creek property a little placer gold was recovered from bench gravel.

Simpson district.—Three placers in the Simpson district produced $554 in gold and 3 ounces of silver, chiefly from the Dandy group near Lucile.

Warren district.—Three placers and two lode mines in the Warren district produced 324 tons of ore, $11,796 in gold, and 205 ounces of silver, valued together at $11,923. The ore had an average value of $12.65 in metals a ton. As the Little Giant mine of the Unity Gold Mines Co., formerly a large gold producer, was active only a short time during 1926 the Golden Rule placer on Grouse Creek was the largest gold producer in the district. Hydraulic operations were conducted from April 1 to June 26, when water was available. Some gold was also won from stream gravel at the Buck Diggings on Huston Creek.

JEROME COUNTY

A little placer gold was recovered from the Johanson claim near Eden and other claims on the north bank of Snake River.

KOOTENAI COUNTY

Wolf Lodge district.—A small test lot of lead ore was shipped from the Caribou property, which is under development.

LATAH COUNTY

The output of Latah County consisted of a little placer gold saved from the Lead To placer in the Gold Creek district and the Hard Work claim in the Hoodoo district.

LEMHI COUNTY

The value of the mine production of metals in Lemhi County in 1926 increased $178,209 over 1925, the largest increase in any county except Shoshone, and the county ranked second to Shoshone in total value of production. The output of silver and lead from the United Idaho property near Gilmore was unusually large, but the production of the Latest Out mine was much less. The copper deposits,[6] described in 1925, were only slightly productive in 1926, although work was said to have opened much ore at the Harmony property.

Brown Butte district.—A small lot of gold ore from the Brown Butte mine was treated by amalgamation.

Carmen Creek district.—The Silver Star property, operated by lessees, produced one lot of oxidized silver-lead ore.

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[6] Ross, C. P., The Copper Deposits near Salmon, Idaho: U. S. Geol. Survey Bull. 774, 1925, 44 pp.

Eldorado district.—At the Harmony property about 950 feet of work was done in crosscuts and drifts, but the mill was not operated. One lot of copper concentrates from former operations was shipped to International, Utah. The mine is extensively developed by six tunnels, and much work was done in 1926 on the lowest level, where a large body of copper ore was said to have been opened early in the year. The tramway was moved to the new tunnel and preparations were made to do regular mining and milling in 1927. An article[7] describing conditions at this mine was published in January, 1927.

Eureka district.—One lot of oxidized lead ore containing gold and silver was shipped from the Red Cross mine, and a lot of lead concentrates rich in gold came from the Queen of the Hills property. The latter property was being developed by the Golden Queen Mining & Milling Co. as lessee and was put in shape for production early in 1927.

Gravel Range district.—A sample lot of silver ore was shipped from the Rabbit Foot group, owned by the Lemhi Mining Co.

Indian district.—The Ulysses mine, a large producer of gold in the past, was not vigorously worked, but a lessee recovered a little gold bullion by re-treating old tailings.

Junction district.—One car of silver-lead ore was shipped from the Maryland prospect, and a little oxidized copper ore and lead ore from the Grizzly Hill mine.

McDevitt district.—One car of copper ore containing considerable gold from the Copper Queen mine was shipped to Anaconda, Mont., for smelting, and a small lot was also marketed from the Lynch claim.

Mackinaw district (*Leesburg*).—Five placers in the Mackinaw district produced $1,817 in gold and 7 ounces of silver, valued together at $1,821. The production was chiefly that of the Hockensmith placer on Arnett Creek, but gold was also produced from the Cleopatra, K. G. W., and Richardson placers. Considerable money was spent for hydraulic equipment at the property of the Leesburg Gold Placers Co. and the Bonanza Placer (Inc.).

Nicholia district.—Several cars of lead concentrate were shipped from the Viola property as a result of jigging operations.

Parker Mountain district.—A sample lot of rich gold ore containing considerable silver was shipped from the Pinch Hit mine.

Pratt Creek district.—A little gold bullion was recovered from ore from the Goldstone mine, and some placer bullion from drift mining at the Sandy Creek claim.

Spring Mountain district.—One car of oxidized lead ore was shipped from the Iron Mask mine and one car of slag from an old smelter dump.

Texas district (*Gilmore*).—Five lode mines in the Texas district produced 23,486 tons of ore, yielding $9,194 in gold, 154,231 ounces of silver, 39,591 pounds of copper, 5,763,787 pounds of lead, and 9,638 pounds of zinc, valued in all at $572,803, or $24.39 in metals a ton. Of the total ore output, 13,340 tons was concentrated and 10,146 tons was first-class shipping ore, almost entirely lead ore. The value of the district output increased $203,327, in spite of the fact that the Latest Out mine produced only a few hundred tons of lead ore. The chief producer was the United Idaho mine, formerly the

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[7] Mining Truth, "Harmony mine actively developing": Jan. 17, 1927, p. 17.

Pittsburg-Idaho, now operated under the control of the United States Smelting, Refining & Mining Co. More than 8,000 tons was first-class lead ore shipped to Midvale, Utah, for smelting, and the remainder, or about 13,000 tons, was milled in a 50-ton concentration plant. The property was active most of the year, but when the power plant was destroyed by fire operations were discontinued for one and a half months until the plant was rebuilt. The company did 1,177 feet of development in 1926 but has only a small quantity of ore in reserve. More than 1,000 tons of oxidized lead ore was shipped from the Gilmore property, and about 600 feet of development was done under the management of the Gilmore Mercantile Co. A small car load of lead ore was also shipped from the Lime Hill property.

OWYHEE COUNTY

The mine production of metals in Owyhee County in 1926 was valued at $12,849, a decrease of $8,276 from 1925. From 1863 to 1926 the county yielded gold valued at $21,693,177 and 24,602,940 ounces of silver, or a value of $40,671,351 for both metals.

Carson district (Silver City).—Nine lode mines in the Carson district produced 46 tons of ore, yielding $2,427 in gold and 6,076 ounces of silver, valued together at $6,218, or $135.17 a ton. Most of the metal output was recovered by smelting 10 tons of crude ore, the remainder being small test lots treated in gold and silver mills. The largest part of the output was rich gold-silver ore from the Trade Dollar mine taken out by lessees. The mine is controlled by the Empire Mines Co., but was not operated on company account. Small lots of ore from the Delamar, War Eagle, Potosi, Tango, and Hoodoo properties were either shipped for smelting or milled. Development work was continued at the Great Western property, and ore of good grade was opened at the Mountain Chief property of the Owyhee Gold Mining Co. A bulletin [8] published in 1926 gives the geology and history of the mines in the vicinity of Silver City that were such large producers of gold and silver from 1863 to 1913.

Castle Creek district.—Three lode mines in the Castle Creek district produced 573 tons of ore, yielding $1,434 in gold, 7,574 ounces of silver, 265 pounds of copper, and 3,028 pounds of lead, valued in all at $6,439, or $11.24 in metals a ton. Several hundred tons of silver ore was milled by the Castle Creek Mining & Milling Co., which ran a 20-ton flotation plant during the first three months of the year. It is reported that the company has about 75,000 tons of $20 ore in reserve. One car of rich gold ore containing considerable silver was shipped from the Happy Boy mine and a test sample of silver ore from the Lucky Day property.

Flint district.—The Flint mine, a large producer of silver in 1924, was idle in 1926. A test lot of gold-silver ore was shipped from the Nellie Ann claim.

POWER COUNTY

A little placer gold was recovered by rocker from the banks of Snake River.

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[8] Piper, A. M., and Laney, F. B., Geology and Metalliferous Resources of the Region about Silver City, Idaho: Idaho Bur. Mines and Geol. Bull. 11, 1926.

SHOSHONE COUNTY

Mine production of gold, silver, copper, lead, and zinc in the Coeur d'Alene region, Shoshone County, Idaho, 1925–26, and total, 1884–1926

Year	Lode mines	Placers	Ore and old tailings	Gold	Silver	Copper	Lead	Zinc	Total value
			Short tons		*Fine ounces*	*Pounds*	*Pounds*	*Pounds*	
1925	48	5	[1]1,714,159	[2] $136,744	[2] 6,701,747	620,444	241,711,973	31,155,037	$28,272,585
1926	58	4	[1]1,850,519	[2] 71,134	[2] 6,952,074	962,447	257,667,986	52,533,485	29,097,421
Total, 1884–1926			(3)	7,131,095	220,896,476	76,390,633	[4] 3,656,824	553,287,471	621,512,898

[1] Includes old tailings, as follows: 1925, 31,767 tons concentrated and 1,560 tons sold to a smelter; 1926, 33,373 tons concentrated and 3 tons sold to a smelter.

[2] Includes placer production, as follows: 1925, $119,197 in gold and 715 ounces of silver; 1926, $46,365 in gold and 228 ounces of silver.

[3] Figures not available.

[4] Short tons.

The value of the mine production of metals in Shoshone County, which includes the Coeur d'Alene region, was $824,836 more in 1926 than in 1925; the gain was due mainly to the increased output of lead-zinc ore. The average total value of the ore and old tailings in 1926 was $15.70 in recovered metals a ton and the value in gold and silver was $2.36 a ton. The kinds of ore (largely lead ore and lead-zinc ore with some copper ore and copper-lead ore) and the contents of each kind have been given in preceding tables.

Most of the ore, as well as 33,373 tons of old tailings, was concentrated and produced 285,819 tons of concentrates yielding on the average $87.88 in metals a ton. Twenty-four milling plants, with a combined daily capacity of approximately 8,026 tons, were active during the year. All but one of these mills were concentration plants with flotation equipment; 11 were wholly flotation mills and had no tables. There were increases in silver, copper, lead, and zinc, but a decrease in gold resulting from the curtailment of operations at the dredge near Murray. The three largest producers of silver and lead and the largest dividend payers in Idaho—the Bunker Hill & Sullivan, Morning, and Hecla mines—are in Shoshone County, at Kellogg, Morning, and Burke. The statement to the county assessor gave $7,957,902 as the net profits of the Coeur d'Alene mines and leases in 1926, a decrease from $8,791,761 in 1925. The value of the ore extracted was greater, but the costs of extraction, freight, treatment, and repairs were decidedly increased.

For further details regarding the mining companies and the flow sheets of some of the mills of the Coeur d'Alene region, reference is again made to the annual report of the State mine inspector for 1926. It was estimated that 6,000 men were employed in Idaho mines in 1926. The average wage for miners was $5.25 a day, but in the Coeur d'Alene region, where a sliding scale is in effect, wages were $5.50 a day for miners. The wage scale in this district was adjusted each month in accordance with a bonus rate based on the selling price of lead. This scale was adopted November 16, 1925.

Beaver district.—A little gold from the Lock & Erwin placer property was marketed in Wallace. The Interstate-Callahan property[9] at Sunset, one of the largest producers of zinc in Idaho from 1913 to 1923, was practically idle. No shipments have been made since June, 1924, but a small crew was kept at work retimbering some of the underground levels and repairing the mill. Lead-zinc ore still available will be mined when conditions are favorable. Conditions at the Galena mine on Lake Gulch are reviewed under Placer Center district.

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[9] Callahan Zinc-Lead Co. Ann. Rept. for 1926.

Coeur d'Alene district.—The electric dredge of the Yukon Gold Co. at Murray was operated from January 1 to May 29; then the plant was shut down permanently. More than $40,000 worth of gold, the result of treating 418,894 cubic yards of gravel, was shipped to a refinery in California. According to the printed annual report of the Yukon Gold Co., which leased this ground from the Coeur d'Alene Mining Co., the cost of operations in 1926 was $38,376 and operating gain was $2,270. The dredge has been worked since 1917 and has produced approximately $1,140,000.

Eagle district.—The Jack Waite mine was operated under lease and produced several hundred tons of crude lead ore and also mill ore that yielded nearly 800 tons of lead concentrate. The 150-ton concentration-flotation plant was completed and operated on a part-time basis. Two cars of crude lead ore were also shipped from the Lead Crystals property north of Prichard.

Evolution district.—Five lode mines in the Evolution district produced 23,773 tons of ore which, with 3,780 tons of old tailings, yielded $93 in gold, 433,048 ounces of silver, 104,304 pounds of copper, 1,079,292 pounds of lead, and 34,930 pounds of zinc, valued in all at $373,881, or $13.57 in metals a ton. The output consisted of 23,585 tons of milling ore, which, with 3,780 tons of old tailings, was reduced to 1,527 tons of lead concentrate, and 188 tons of crude smelting ore.

The largest production of both silver and lead was that of the Yankee Boy mine east of Big Creek, worked by the Sunshine Mining Co. Other than one car of lead ore rich in silver, the output consisted of about 21,000 tons of mill ore, which was treated in the 100-ton flotation plant. About 1,400 feet of development was done during the year, and it was estimated that the company had in reserve 131,000 tons of probable and possible ore. The gross value of the ore and concentrate marketed was $277,955, and the net profits reported to the county assessor amounted to $65,570. No dividends were paid by the company, but its financial condition was much improved over 1925. The output of the Western Union property was comparatively small, consisting of two cars of crude ore and several hundred tons of ore treated in the Hercules mill at Wallace, which was used as a custom concentration-flotation plant. More than 2,000 feet of development was done in 1926, but no estimate of reserves was published. Several cars of lead concentrate were shipped as a result of treating old tailings at the Iron King dump; old creek tailings were treated at the Osborne dam by Harr Brothers. The Silverado mine, worked by the Lincoln Mining Co., produced copper-lead ore; considerable development was done in the tunnel and shaft and resulted in opening up a large quantity of ore. The mine is equipped with a 50-ton milling plant recently reconstructed. About 1,200 feet of work was done in driving a long tunnel at the Rainbow property.

Hunter district (*Mullan*).—Nine lode mines in the Hunter district produced 662,958 tons of ore which, with 35 tons of old tailings, yielded $2,833 in gold, 2,143,154 ounces of silver, 303,475 pounds of copper, 88,541,425 pounds of lead, and 33,207,196 pounds of zinc, valued in all at $10,956,501, or $16.53 in metals a ton. The output was more valuable than that of any other district in Idaho in 1926 and increased $1,601,850 over 1925, due chiefly to the large shipments of lead-zinc ore from the Star mine. The total output was 23,863 tons of first-class ore, and 639,095 tons of mill ore which, with 35 tons of old tailings, was reduced to 108,404 tons of concentrates.

The Morning mine of the Federal Mining & Smelting Co. was the largest producer of silver and zinc and the second largest producer of lead in Idaho in 1926. Lead ore and concentrate were shipped to East Helena, Mont., and the zinc product to the electrolytic plant near Great Falls, Mont. The mine is opened by a vertical shaft 2,250 feet below the main adit and by 24,228 feet of drifts and tunnels. In 1926 nearly 4,000 feet of development was done in drifts, crosscuts, and raises. The reserves are estimated at 138,410 tons of first-class ore, averaging 10.74 ounces of silver to the ton and 27.92 per cent of lead, and 2,069,304 tons of milling ore, averaging 3.85 ounces of silver to the ton, 8.66 per cent of lead, and 5.09 per cent of zinc. The ore is hand-sorted and then treated by selective flotation, the 1,200-ton concentration-flotation plant having been changed to an all-flotation plant. The company, which also operates mines in Kansas, Missouri, and Oklahoma, paid dividends in 1926 amounting to $3,146,378, or a total of $21,923,924 to date.

According to the figures given the county assessor ore extracted from the Morning mine had a gross value of $8,018,028. The cost of extraction was $2,847,291, freight and treatment $2,501,766 and betterment and repairs $125,365; the net profit was $2,543,606. The Sheridan lease on the upper part of the Morning mine also produced 71,530 tons of ore, valued at $387,086. Extraction cost $372,044, and the net profit was $15,042. The printed annual report of the company for 1926 gives the following data:

> The earnings of the Morning mine amounted to $2,622,218, an increase of $253,597 over 1925. The ore mined increased 24,202 tons over 1925.
>
> The grade of the ore was slightly lower, but notwithstanding that, and the fact that metal prices also were lower than in 1925, an increased profit of 10.7 per cent was made from a tonnage that was increased only 6 per cent. This was due to lower operating costs and to improved milling results.
>
> The ore mined averaged 9.39 per cent of lead, 4.13 ounces of silver to the ton, and 5.53 per cent of zinc. This includes milling ore mined by leasers and purchased from them. * * *
>
> Notwithstanding that 423,881 tons were mined in 1926, the developed ore shows an increase of 367,000 tons, due to the fact that the mine workings were extended 200 feet deeper during the year. * * *
>
> The 3,050 level was reached, and though it has not yet been drifted on, the ore, where intersected by the crosscut from the shaft, is 15 feet wide, assaying 3.4 ounces of silver per ton, 11.2 per cent of lead, and 9 per cent of zinc.
>
> Since 1912 the Morning mine has produced 4,843,683 tons of ore.

From 423,881 tons of ore, including lead-zinc ore milled and first-class lead ore smelted, lead products were made that contained 1,492,077 ounces of silver and 71,104,000 pounds of lead; lead-zinc ore and zinc concentrate were shipped that contained 155,632 ounces of silver, 2,740,000 pounds of lead, and 27,976,000 pounds of zinc.

The Gold Hunter Mines (Inc.) operated its 500-ton concentration-flotation plant the entire year and shipped about 10,000 tons of silver-lead concentrate to the Bunker Hill smelter at Bradley. More than 3,000 feet of development was done, chiefly in drifts and crosscuts. According to the figures given to the county assessor, the company shipped 10,206 tons of concentrate, which had a gross value of $571,543. The cost of extraction was $333,528 and freight and treatment $181,401; the net profit was $56,614. One small car of lead ore was shipped from the Alice mine east of Wallace, and a test car of lead-zinc ore from the Butte & Coeur d'Alene property was shipped to the Timber Butte custom mill at Butte, Mont. The Star mine of the Sullivan Mining Co. was active throughout the year, and nearly 120,000 tons of lead-zinc ore was raised through the Hecla shaft at Burke to be treated in the South mill of the Bunker Hill Co. at Kellogg. In December the company was raising 475 tons a day. The resulting lead concentrate was smelted at the Bunker Hill plant at Bradley and the zinc product sold to the Vieille Montagne Zinc Co., Chenee, Belgium. The mine is opened by a 9,000-foot crosscut from the 2,000-foot level of the Hecla mine at Burke, and more than 6,000 feet of development was done in 1926. The annual report of the Bunker Hill & Sullivan Mining & Concentrating Co. includes the following paragraph:

> Like lead, the price of zinc declined during the year, slightly affecting the earnings of the Star mine, which was operated at capacity during the whole year with vigorous pushing of its development by the Sullivan Mining Co., one-half owned by our company. Completion of payment of the purchase price of the Star mine will have been made from royalty charges during March or April of the current year. Construction of Sullivan Mining Co.'s zinc reduction plant was begun in the year and excellent progress has been made. The plant should be in full operation before the end of 1927.

At the old Snow Storm mine, under lease to the Oregon-Idaho Mining & Concentrating Co., a 100-ton flotation plant was built and operated in 1926. Several thousand tons of ore containing chalcocite, bornite, and chalcopyrite was treated in the latter part of the year. About 20,000 tons of ore assaying 2 ounces of silver to the ton and 2 per cent of copper is said to be in reserve. Ore of good grade was opened at the Hector mine east of Wallace, and one car of lead concentrate shipped by the Sheridan Leasing Co. Lessees working the old dump of the Ruth mine, between Alice Spur and Mullan, shipped some lead-zinc ore to Butte, Mont., for milling and also a little crude lead ore to Bradley, Idaho, for smelting. Active development work was continued at the Independence, Idaho Carbonate Hill, and West Hunter properties.

Lelande district (*Burke, Mace, Frisco*).—Eleven lode mines in the Lelande district produced 312,947 tons of ore which, with 287 tons of old tailings, yielded $7,532 in gold, 1,767,927 ounces of silver, 251,495 pounds of copper, 61,018,082 pounds of lead, and 591,252 pounds of zinc, valued in all at $6,071,718, or $19.38 in metals a ton. The district output decreased $904,237, as the Hercules mine at Burke, now depleted, made its last shipments early in 1925. The output comprised 24,935 tons of first-class ore, and 288,012 tons of mill ore which, with 284 tons of old tailings, was reduced to 40,534 tons of concentrates. There were also 3 tons of old tailings shipped to a smelter.

The largest producer of the district was the Hecla Mining Co. at Burke, which shipped first-class lead ore and concentrate to the Bunker Hill smelter at Bradley. The mine is opened by a 2,240-foot vertical shaft and various drifts, and more than 8,300 feet of development work was done in 1926. About 2,640,000 tons of ore is said to be in reserve. The 750-ton concentration-flotation plant was active throughout the year, treating nearly 278,000 tons of lead ore, and the new addition for the treatment of current tailings was run regularly. The complete plant [10] was fully described in September. The company was the third largest producer of lead in Idaho, was second only to the Morning mine in the production of silver, and paid $2,000,000 in dividends in 1926, or $16,105,000 to date. In an effort to find new ore reserves the company did considerable work at the Minnie Moore mine in Blaine County and was prospecting several properties near Bayhorse in Custer County.

Of the ore mined, 277,996 tons was milled, making 38,676 tons of concentrate which, with 21,887 tons of crude ore, was smelted and contained 1,648,680 ounces of silver and 59,055,586 pounds of lead. According to the published reports the output of the Hecla mine for 23 years was 722,519 tons of crude ore and concentrate containing 20,233,763 ounces of silver, 708,593,362 pounds of lead, and 941,229 pounds of crude zinc.

According to the figures given to the county assessor, 348,706 tons of ore was extracted, which had a gross value of $5,479,368. The cost of extraction was $1,799,136, freight and treatment $978,031, and betterment and repairs $242,273; the net profit was published as $2,459,928. After paying $2,530,476 for various expenses, including $274,553 for depreciation and depletion, the company paid $655,940 in taxes and $2,000,000 in dividends, which drew $125,464 from the former surplus and left a surplus of $3,196,933 on December 31, 1926. Additional notes from the company's printed annual report follow:

> In the year just closed, the ouput was the highest in the company's history, except for the years 1917 and 1918, when we expanded our production beyond our own concentrating capacity through the use of leased concentrators. The average prices of lead and silver were both lower than in the preceding year. * * *
>
> Shareholders were advised * * * of the plans for the construction of a zinc reduction plant by the Sullivan Mining Co., which company is owned equally by the Hecla Mining Co. and Bunker Hill & Sullivan Mining and Concentrating Co. The plant is being erected near Kellogg, Idaho, and will probably be completed about the end of 1927, and will cost between a million and a quarter and a million and a half dollars. Half of the funds for this construction must be furnished by the Hecla Mining Co. * * *
>
> A tailings mill for the finer grinding of coarse tailings and the treatment of the material by flotation was placed in use in December, 1925. Not much could be said about the results obtained at the time of the last annual report. After a full year of operation it has proven to have been a very successful installation and to have brought recoveries to a very high percentage of the total metal contained in the ores.

The Hercules mine was exhausted in 1925, but the concentration plant at Wallace was remodeled in 1926 and was used on a part-time basis for treating custom ore. Nearly 1,000 feet of sinking and drifting was done at the Hummingbird mine, which is opened by a crosscut tunnel 5,000 feet long and a shaft 200 feet deep. Several thousand tons of ore was treated at the Hercules mill, producing lead concentrate and zinc concentrate. The Ambergris mine at Burke produced several thousand tons of lead ore, which was also concentrated at the Hercules custom plant. Several thousand tons of lead ore mined by lessees was shipped from the Mace, Frisco, and Gem mines of the Federal Mining & Smelting Co. The output of the Ajax Mining Co. was comparatively small, consisting of several cars of lead ore shipped to the Bunker Hill smelter, but the company did about 500 feet of drifting and 2,000 feet of diamond drilling. A few cars of concentrate were milled from old tailings along Canyon Creek.

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[10] Ziegler, W. L., "Concentrating lead-silver ore at Hecla mine": Eng. and Min. Jour., vol. 122, Sept. 18, 1926, p. 444.

Placer Center district (*Sunset*).—Six lode mines in the Placer Center district produced 177,741 tons of ore, which yielded $70 in gold, 395,019 ounces of silver, 64,523 pounds of copper, 15,333,093 pounds of lead, and 3,164,266 pounds of zinc, valued in all at $1,719,563, or $9.67 in metals a ton. The output was 2,029 tons of first-class lead ore, and 175,712 tons of mill ore which yielded 18,321 tons of concentrates. The total value of the recovered metals decreased $255,954, as fewer shipments of lead concentrate and zinc concentrate were made from the Success and Tamarack & Custer properties.

The largest producer was the Tamarack & Custer property, which was operated full time by the Tamarack & Custer Consolidated Mining Co. The mill at Frisco has a capacity of 500 tons and is equipped for concentration and flotation. Lead concentrate was shipped to East Helena, Mont., and zinc concentrate to Portland, Oreg., for export. The property is opened by more than 56,000 feet of workings, and during 1926 nearly 6,000 feet of work was done in drifts, crosscuts, and raises. Formerly the mine was worked from Sunset and the products were shipped down Nine Mile Creek, but now it is worked through the No. 7 tunnel or old Mammoth level, purchased from the Federal Mining & Smelting Co., and ore is delivered to the mill in Canyon Creek. Work on the No. 6 and No. 7 levels, connected by an 800-foot raise, is said to have opened some new ore, but two of the three veins were unproductive. In 1926 no dividends were paid and no statement was published regarding the ore reserves. According to the figures given to the county assessor the company shipped 15,024 tons of concentrates, which had a gross value of $1,198,333. The cost of extraction was $859,696, freight and treatment $304,707, and betterment and repairs $6,930; the net profit was $27,000. Considerable lead-zinc ore from the Granite mine was milled by the Success Mining Co., which marketed mainly zinc concentrate. The plant was operated for seven months only; then the lower levels of the mine were abandoned and the equipment scrapped or sold. The Success property was a large producer of zinc from 1907 to 1918 and from 1923 to 1926. The most interesting new development was that of the Galena mine, operated by the Callahan Zinc-Lead Co. A 150-ton flotation plant was completed October 15, and several hundred tons of lead concentrate was shipped to East Helena, Mont. The mine is opened by an 800-foot vertical shaft and 16,500 feet of drifts. During 1926 about 2,000 feet of development was done, chiefly drifting, as a result of which the company has 115,000 tons of lead ore in reserve. The following paragraphs are taken from the printed report of the Callahan Zinc-Lead Co. for 1926:

> The Galena property consists of 91 lode mining claims and a mill site, comprising approximately 1,533 acres. * * *
>
> The property is developed by a long surface tunnel and a standard vertical shaft sunk to a depth of 800 feet, with stations cut at 200-foot intervals. Drifts have been driven both east and west from the shaft stations, disclosing ore of commercial value. Ore is being stoped on the 600, 400, and 200 west and 200 east levels. On the 600 level, at a point 1,000 feet east from the main shaft, a two-compartment vertical winze was sunk on the vein to a depth of 800 feet. A large hoist station, together with ore pockets, has been cut at the collar of the winze, and a 150-horsepower heavy-duty electric hoist installed. Stations have been cut in the winze at 200-foot intervals, and drifts driven both east and west from these stations. Commercial ore was disclosed on the different levels both east and west from the winze. Ore is being stoped on the different levels, which will be known in the future as 800, 1,000, 1,200, and 1,400 winze levels. * * *
>
> The estimate of our ore reserves, as given in my last annual report as 115,000 tons, is conservative. We have been stoping the different ore bodies throughout the mine, and the ore is showing an average mill feed for four months of 5.6 per cent of lead and 3.9 ounces of silver. * * *
>
> Our new flotation plant, that was put in operation the latter part of last October, is located approximately 700 feet north of the collar of the shaft. The ore from the mine is delivered into a 150-ton storage bin and from there passes through a 10 by 20 Blake type crusher and 16 by 36 rolls into a mill bin of 450 tons capacity. From there it is drawn into an 8-foot Hardinge ball mill, connected in closed circuit with a duplex Dorr classifier. This classifier discharges into a 10-cell Minerals Separation flotation machine of the latest type. The concentrate from these machines is pumped into a 30-foot Dorr thickener tank, and from there to an Oliver filter, giving us a product with about 6 per cent moisture. This is transported by truck to our loading station.
>
> If it were decided at any time to double the capacity of the mill, all that would be needed would be to add another 8-foot Hardinge ball mill, Dorr classifier, and a 10-cell M. S. flotation machine. The balance of the mill is already equipped for this additional tonnage.
>
> We are shipping approximately 450 wet tons in a 30-day month of lead concentrate, running better than 50 per cent of lead and 39 ounces of silver. Our mill is doing excellent work, making a high recovery. Our milling cost is low, as a total of five men, including mill superintendent and assayer, operate the mill three 8-hour shifts daily.

The deficit for the year was $95,346; the expenditures included the expense ($22,342) of maintaining the Callahan mine and the cost ($93,079) of development at the Galena property.

The property of the Strattons Mines Co. on Nine Mile Creek, controlled by the Day interests, was operated continuously and produced nearly 2,000 tons of first-class sulphide silver-lead ore. According to a statement to the county assessor the gross value of the ore was $178,926 and the net profit was $62,338. The property is opened to a depth of nearly 200 feet, and about 1,000 feet of work, chiefly in crosscuts, was done in 1926. The California group was being developed further by the Option Mining Co. Two cars of lead-zinc ore were shipped from the dump of the Sisters property to the Timber Butte plant at Butte, Mont.

St. Joe district.—The White Rock and other placer claims southwest of Superior, Mont., were operated by hydraulic and sluicing methods and produced a little gold bullion.

Summit district.—Four lode mines in the Summit district produced 579 tons of ore, yielding $2,515 in gold, 617 ounces of silver, 4,721 pounds of copper, 121,700 pounds of lead, and 39,867 pounds of zinc, valued in all at $16,287, or $28.13 in metals a ton. The output consisted of 60 tons of first-class lead ore, 50 tons of ore treated by amalgamation, and 469 tons of mill ore which yielded 131 tons of concentrates. Several hundred tons of copper-lead ore was milled at the new plant of the Giant Ledge Syndicate, but the property was closed after a short run, as the company lacked capital. A little gold ore from the Mountain Lion mine near Murray was treated by amalgamation. One lot of crude lead ore and two cars of lead-zinc milling ore were shipped from the Terrible Edith mine, east of Murray. The Orofino property in Bear Gulch, 7 miles northeast of Murray, was operated by Harry L. Day, and one car of rich lead ore was shipped to East Helena, Mont.

Yreka district (*Kellogg*).—Twenty-one lode mines in the Yreka district produced 631,647 tons of ore which, with 29,274 tons of old tailings, yielded $11,726 in gold, 2,207,096 ounces of silver, 233,517 pounds of copper, 90,464,466 pounds of lead, and 15,495,974 pounds of zinc, valued in all at $9,821,001, or $14.86 in metals a ton. The value of the output increased $330,085, but was more than $1,000,000 less than the value of the Hunter district. The output consisted of 7,043 tons of crude smelting ore, and 624,604 tons of milling ore which, with 29,274 tons of old tailings, yielded 116,127 tons of concentrates.

The Bunker Hill & Sullivan Mining & Concentrating Co. operated its mine at Kellogg continuously, ran three concentration-flotation mills, two of which were used partly for custom ore, and directed the operations of several neighboring properties under its control. About 7,300 tons of silver-lead concentrate a month was shipped to the Bunker Hill smelter at Bradley and to plants of the American Smelting & Refining Co. at Selby, Calif., and Omaha, Nebr. The mine is worked through the 18,000-foot Kellogg adit and by an inclined shaft which opens the deposit to a depth of 1,900 feet below the Kellogg level. According to the statement given the county assessor, 459,761 tons of ore was extracted, which yielded concentrates that had a gross value of $7,202,042. The cost of extraction was $2,057,233, freight and treatment $2,252,350, and betterment and repairs $440,502. The net profits, including $75,159 in royalties, were $2,527,116. Dividends aggregated $2,981,710 in 1926, or a total of $36,774,920 paid since 1890. Several thousand tons of old silver-lead tailings from the Bunker Hill dump were treated in the experimental plant north of the main Bunker Hill mill. The following notes are taken from the company's printed annual report for 1926:

> During the calendar year 1926 operations of the mines and plant of the company were continuous and highly productive; the outstanding facts and accomplishments are:
>
> Production of mine-run ore and yield of lead and silver were very closely the same as that for 1925, which in turn substantially exceeded that for 1924.
>
> Production costs were slightly lower. * * *
>
> Net earnings, because of lower metal prices, were less than during 1925, but were sufficient to justify the dividends paid in the year. * * *
>
> The main hoisting shaft of the Bunker Hill mine was sunk to a new level, No. 19, 2,000 feet vertically below the Kellogg adit tunnel level, and a good start has been made on the mine workings at this point. It is interesting that this bottom level of the mine is 3,220 feet vertically below the point at which ore was first discovered on the surface of the Bunker Hill claim, and 3,870 feet below the highest point at which ore has been mined in our properties; and from the lowest point in the mine at which ore is now produced to the place where ore was first discovered on the surface of the Bunker Hill claim is a straight line distance of 4,972 feet, nearly 1 mile, along the axis of the ore body. * * *
>
> Our Sweeny mill was remodeled for the treatment of custom zinc-lead-silver ore, and a 3-mile aerial tramway completed and put into successful operation for the delivery of such ores from the Pine Creek field lying to the south of us. * * * We have blocked out ore to date 178,040 tons in the Sullivan mine and 3,711,360 tons in the Bunker Hill mine.

The ore milled (459, 761 tons) was reduced to 81,667 tons of concentrate which contained 46.37 per cent of lead and 17.12 ounces of silver to the ton. The ratio of concentration was 5.63 to 1, and the costs per ton mined were as follows: Mining, $3.193; concentrating, $0.703; shipping, $0.043; and other costs, $0.212; a total of $4.155. From 1886 to the end of 1926 the company has mined 11,650,355 tons of ore having a gross value of $135,826,308. Net smelter returns have been $83,315,608 and operating profit $47,373,464.

The Bunker Hill smelter and refinery ran continuously in 1926, largely on ore and concentrate from the Bunker Hill and Hecla mines but partly on custom ore from western States, Alaska, British Columbia, and South America. About 5,400 tons of pig lead was sold monthly, as well as refined gold and silver. The equipment includes four large blast furnaces, but only two were in use during the year. The company is interested with the Hecla Mining Co. in the new electrolytic zinc plant at Kellogg, construction of which was started in July. When completed it will produce 50 tons of zinc a day from Star ore and from custom zinc material. The following paragraph is taken from an editorial[11] published in 1926:

> The design of the new plant has been made by U. C. Tainton and the metallurgical staff of the Bunker Hill company. Mr. Tainton was the pioneer in many of the latest developments in electrolytic technique; he has been an advocate of the use of high-acid solutions, of high-current density, of mechanical agitators, and of other procedures that have been adopted generally in the last few years. Doubtless the new plant will incorporate the very best and latest methods and equipment, benefiting not only from the work in the pilot plant at Kellogg but from the results obtained in practice at Trail, in British Columbia, and at Great Falls. In view of the rapid advance in the art, it should be a definite advantage to build from the beginning, with the accumulated knowledge of several years as a guide. A remarkably efficient plant should be the result.

The Crescent mine, owned by the Bunker Hill & Sullivan Mining & Concentrating Co., was operated the entire year, and a large quantity of copper ore was milled in the 120-ton flotation plant, formerly the Alhambra mill. Several hundred tons of rich silver-copper concentrate was shipped to the Bunker Hill smelter. In the last few years the property has been an important producer of silver and was sixth in order of output in 1926. According to the figures given to the county assessor, 13,251 tons of ore was extracted, which yielded concentrates that had a gross value of $208,306. The cost of extraction was $60,726, freight and treatment $27,904, and betterment and repairs $9,282. The net profit was $110,394.

Old stope fillings containing silver, copper, and lead continue to be shipped by the Caledonia Mining Co., which has paid $4,308,306 in dividends in the past. According to the printed statement, the company shipped 3,220 tons of ore, containing 49,567 ounces of silver and 224,042 pounds of lead, which had a gross value of $48,067. The cost of extraction and freight was $21,867 and treatment $18,986, and the net profit was $7,214. The surplus of $451,634 was not distributed until the first part of 1927, as the tax claims against the company had not been settled.

The Constitution Mining & Milling Co. was a large producer of silver, lead, and zinc, but chiefly of zinc. The 200-ton flotation plant, the capacity of which was increased in 1926, was operated the entire year and treated 49,554 tons of ore. The mill produced

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[11] Eng. and Min. Jour., "Coeur d'Alene to have an electrolytic zinc plant": Vol. 122, July 10, 1926, p. 43.

9,119 tons of concentrates, containing 242.57 ounces of gold, 102,775 ounces of silver, 3,222,770 pounds of lead, and 7,516,784 pounds of zinc, which had a gross value of $945,979. The net amount received from the smelter was $364,546, but owing to the large expense in increasing the capacity of the mill and doing extensive development work the company operated at a loss. The product of the mill was chiefly a lead-zinc concentrate shipped to Great Falls, Mont. The company has in reserve about 30,000 tons of ore containing about 5 per cent of lead and 10 per cent of zinc. Nearly 1,500 feet of development was done in drifts, crosscuts, and raises. A three-compartment shaft was started 1,000 feet from the portal of the main adit level and 600 feet vertically from the surface. The Hypotheek mine, which is opened by a three-compartment shaft and 20,000 feet of drifts, crosscuts, and raises, produced about 2,000,000 pounds of lead as the result of shipping crude ore and concentrate. The 150-ton milling plant is equipped with jigs, Wilfley tables, and flotation cells. About 1,000 feet of development was done during the year, and the mine became a large producer after being practically idle since 1918. According to the figures given to the county assessor, 12,623 tons of ore was extracted, which had a gross value of $157,140. The cost of extraction was $36,482, freight and treatment $40,089, and betterment and repairs $45,626; the net profit was $34,943. The Douglas mine, an old producer of lead-zinc ore, was operated by the Douglas Leasing Co. More than 3,000 tons of crude ore was shipped from Heim Spur to the Timber Butte mill at Butte, Mont., to be separated into a lead concentrate and a zinc concentrate, for which the company received $57,656. The Page and Blackhawk properties of the Federal Mining & Smelting Co., operated as one mine, were being further developed by 2,300 feet of drifts and crosscuts. A 250-ton flotation plant was completed and operated a short time at the close of the year. The plant, which consists chiefly of crusher, Hardinge ball mill, Minerals Separation and Callow flotation machines, Dorr thickener, and Oliver filter, was fully described in the mine inspector's report for 1926. The material being treated is lead-zinc ore containing chiefly lead. Reserves are estimated at approximately 250,000 tons of developed and probable ore, averaging 1.98 ounces of silver to the ton, 6.77 per cent of lead, and 2.83 per cent of zinc. When in full operation the property will be a new large producer for the district. The Nabob property, a large producer of both lead and zinc in 1925, made no shipments in 1926 but ran about 1,800 feet of drifts and crosscuts. The company was under considerable expense for development and equipment and reported a deficit of $64,207 in August, 1926. The Sidney Leasing Co. shipped nearly 20,000 tons of lead-zinc ore, which was conveyed to the Bunker Hill custom mills. The new 16,000-foot aerial tramway from the Sidney mine to the Sweeny mill was completed and used late in the year. The company estimates 200,000 tons of ore in reserve, assaying approximately 2 ounces of silver to the ton, 6 per cent of lead, and 12 per cent of zinc. Development during 1926 consisted of 1,700 feet of drifts and raises. According to the figures given to the county assessor, 20,286 tons of ore was extracted, which had a gross value of $157,337. The cost of extraction was $88,324, freight and treatment $53,576, and betterment and repairs $6,632. The net profit was $8,805, and dividends amounting to $7,500 were paid. The Sierra Nevada property, controlled by the Bunker Hill & Sullivan Mining & Concentrating Co., was operated by lessees and produced several hundred tons of first-class lead ore shipped for smelting and an equal amount of lead-zinc mill ore, which was treated at the Sweeny custom plant. The Stewart mine, a large producer of lead from 1910 to 1917, and especially from 1911 to 1915, was operated eight months by lessees. About 1,000 tons of rather low-grade oxidized lead ore was shipped to the Bunker Hill smelter. A lessee shipped a little lead-zinc ore from the Stemwinder property of the Bunker Hill Co. to Butte, Mont., for milling. The output was not large, but the occurrence of sphalerite was interesting as zinc occurs very sparingly in the Bunker Hill ore. The Highland-Surprise mine was operated the entire year, as well as the 125-ton concentration-flotation plant, which is equipped with Wilfley tables, ball mill, and Groch and O. & D. flotation cells. About 26,000 tons of lead-zinc ore was milled, yielding lead concentrate, which was shipped to the Bunker Hill smelter, and lead-zinc concentrate (the chief product), which was exported. The company is said to have more than 90,000 tons of lead-zinc ore in reserve. In 1926 a two-compartment shaft was sunk 135 feet, and 520 feet of drifting was done. According to the figures given to the county assessor, 26,259 tons of ore was extracted, which yielded concentrates that had a gross value of $550,034. The cost of extraction was $128,588, freight and treatment $381,572, and betterment and repairs $41,680. The net loss was $1,806. For several weeks old creek tailings were treated by the Saunders Metals Corporation, and a large quantity of old lead tailings was treated in a 150-ton flotation plant by the Hayes Co. Lessees working the Wyoming property shipped about 200 tons of first-class silver-lead ore, and several cars of lead-zinc ore were shipped from the Little Pittsburg and Hilarity properties to a custom mill for testing. After a new compressor and hoist were purchased the shaft at the Hilarity mine was sunk to a depth of 200 feet. Considerable development work was also done at the Amy-Matchless, North Bunker Hill, and Lookout Mountain properties.

TWIN FALLS COUNTY

Snake River district.—Gold valued at $1,116, with 3 ounces of silver, was recovered from placer claims on Snake River. The Sandy Bar placer, less than a mile west of Twin Falls, was the largest producer.

VALLEY COUNTY

The value of the mine production of metals in Valley County increased from $843 in 1925 to $8,548 in 1926. Most of the output was gold ore from the Sunnyside mine, treated by amalgamation, and placer gold from the Dewey mine, both near Thunder Mountain.

Big Creek district.—Gold nuggets and dust from the Pearl placer near Clover were sold to the assay office at Boise, to the mint at San Francisco, and to local purchasers.

Deadwood Basin district.—Development was continued in the tunnel of the Merry Blue mine, and a small lot of gold concentrate was shipped from former operations. Nearly 2,200 feet of work was done in drifts and tunnels at the Lost Pilgrim and Hall Interstate groups by the Bunker Hill & Sullivan Mining & Concentrating Co.

Thunder Mountain district.—One placer and two lode mines in the Thunder Mountain district produced 690 tons of ore, $5,909 in gold, and 226 ounces of silver, valued together at $6,050. Gold was recovered at the Dewey mine, where weathered surface material was treated by placer operations. A little testing was done in the new 5-stamp mill installed at the Iron Clad mine. Most of the output of the district was that of the Sunnyside property, which was operated under lease. The mine is opened by more than 10,000 feet of old workings, and about 350 feet in raises and tunnels was done in 1926. The 10-stamp steam mill equipped for amalgamation was run from April 15 to August 5, when the water supply gave out.

Yellow Pine district.—The United Mercury Mines Co. shipped two cars of silver ore containing a little gold. The company was organized to develop the deposits of cinnabar, but the property also has some ore containing gold and silver.

WASHINGTON COUNTY

Snake River district.—A little placer gold was recovered from the bars of Snake River by drift mining, largely from the Sturgill Creek property.

GOLD, SILVER, COPPER, LEAD, AND ZINC IN WASHINGTON

(MINE REPORT)

By C. N. Gerry[1]

SUMMARY

The value of the mine production of gold, silver, copper, lead, and zinc in Washington in 1926 was 15 per cent less than in 1925. The increase in the quantity of copper and silver was more than offset by the decreases in gold, lead, and zinc. The largest decreases were in the output of gold from Whatcom County and in lead from Stevens County. The total value of the metal output was less than the yearly average of the decade 1917 to 1926, which was about $1,087,800.

Since 1860 Washington has yielded an output of the five metals, as follows: Gold, $29,517,552; silver, 8,949,094 fine ounces; copper, 21,385,067 pounds; lead, 59,002,399 pounds; and zinc, 11,495,380 pounds. The total value has been $45,075,212, of which 65 per cent represents the value of the gold. Dividends paid by the Gladstone Mountain Mining Co. in 1926 from mining operations in the State amounted to $92,532.

The value of the metal output of Stevens County, which was more than half the total for the State, decreased decidedly, but fair increases were shown in Ferry and Snohomish Counties, the other two important centers of mining.

The prices given in the table that follows are those at which the values for metals in this report have been calculated. The silver prices for 1917 and 1919 are dealers' buying price, New York; for 1918, average price as stated by the Bureau of the Mint; for 1920 to 1922, New York market price for domestic silver only; for 1923, average price under the Pittman Act, from January 1 to June 2, for domestic silver, and average New York price for all silver after that period; for 1924 and later years, average New York price for bar silver. The copper, lead, and zinc prices are weighted averages, for each year, of all grades of primary metal sold by producers.

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[1] The valuable assistance of B. N. Lowry and Paul Luff, of the Bureau of Mines, is acknowledged.

Prices of silver, copper, lead, and zinc, 1917–1926

Year	Silver	Copper	Lead	Zinc	Year	Silver	Copper	Lead	Zinc
	Per fine ounce	*Per pound*	*Per pound*	*Per pound*		*Per fine ounce*	*Per pound*	*Per pound*	*Per pound*
1917	$0.824	$0.273	$0.086	$0.102	1922	$1.00	$0.135	$0.055	$0.057
1918	1.00	.247	.071	.091	1923	.82	.147	.070	.068
1919	1.12	.186	.053	.073	1924	.67	.131	.080	.065
1920	1.09	.184	.080	.081	1925	.694	.142	.087	.076
1921	1.00	.129	.045	.050	1926	.624	.140	.080	.075

Mine production of gold, silver, copper, lead, and zinc in Washington, 1917–1926

Year	Mines producing		Ore and old tailings (short tons)	Gold		Silver	
	Lode	Placer		Fine ounces	Value	Fine ounces	Value
1917	119	17	172,119	23,816.17	$492,324	282,320	$232,632
1918	74	10	138,911	14,737.83	304,658	310,093	310,093
1919	42	7	100,879	12,232.20	252,862	259,384	290,510
1920	35	9	85,318	5,846.60	120,860	199,678	217,649
1921	26	11	22,885	6,215.51	128,486	142,450	142,450
1922	33	13	36,046	9,044.43	186,965	205,046	205,046
1923	30	6	56,900	16,547.49	342,067	227,187	186,293
1924	30	4	44,383	14,977.72	309,617	213,742	143,207
1925	37	9	50,287	11,138.49	230,253	166,425	115,499
1926	49	9	54,343	9,340.82	193,092	171,649	107,109

Year	Copper		Lead		Zinc		Total value
	Pounds	Value	Pounds	Value	Pounds	Value	
1917	2,199,518	$600,468	9,789,687	$841,913	1,195,567	$121,948	$2,289,285
1918	1,922,406	474,834	5,271,815	374,299	38,873	3,537	1,467,421
1919	1,676,576	311,843	2,146,157	113,746	----------	----------	968,961
1920	1,983,134	364,897	5,787,247	462,980	426,496	34,546	1,200,932
1921	251,544	32,449	143,553	6,460	449,360	22,468	332,313
1922	317,203	42,822	1,381,199	75,966	1,228,229	70,009	580,808
1923	871,999	128,184	2,906,479	203,454	3,024,535	205,668	1,065,666
1924	928,458	121,628	3,935,376	314,830	910,890	59,208	948,490
1925	1,159,057	164,586	5,627,241	489,570	1,217,846	92,556	1,092,464
1926	1,351,890	189,265	4,546,228	363,698	1,044,354	78,327	931,491

Gold and silver produced at placer mines in Washington, 1917–1926, in fine ounces

Year	Gold	Silver	Year	Gold	Silver
1917	283.86	86	1922	162.44	49
1918	165.93	45	1923	73.09	23
1919	60.32	18	1924	33.77	12
1920	71.20	16	1925	52.87	11
1921	148.66	48	1926	1,354.50	456

GOLD

The decrease of 16 per cent in the mine production of gold in 1926 was due to the inactivity of the mill of the Boundary Red Mountain property in Whatcom County; there were large increases in the output of gold from Ferry and Kittitas Counties. Ores shipped directly to smelters yielded 78 per cent of the gold, concentrates and placers 16 per cent, and old tailings 6 per cent. Nearly

83 per cent of the gold was recovered from gold ore and old tailings, largely from Ferry County. The chief producers were the Quilp and Last Chance mines at Republic and the Kittitas Gold Mining Co., operating a dredge near Cle Elum, Kittitas County.

SILVER

The mine production of silver in Washington increased 3 per cent in quantity over 1925. Most of the output in 1926 came from the Colville district, Stevens County, and the Republic district, Ferry County. The output of Ferry County increased greatly, but there was a large decrease in Stevens County. Crude ore shipped to smelters yielded 81 per cent of the silver and concentrates nearly all the remainder. Lead ore yielded 48 per cent of the silver, gold ore and old tailings 33 per cent, and copper ore and lead-zinc ore more than 18 per cent. The Old Dominion mine near Colville was the largest producer, followed by the Quilp and Last Chance mines at Republic and the Sunset mine near Index.

COPPER

The mine production of copper in Washington in 1926 increased nearly 17 per cent in quantity and was more than the annual average for the decade 1917 to 1926. A little crude copper ore was shipped from Index, Snohomish County, and from Glacier Basin, Pierce County. The Sunset Copper Co. near Index was the only large producer in the State.

LEAD

The mine production of lead in Washington decreased 19 per cent in quantity in 1926 as a result of the decrease in shipments from Springdale and Northport, Stevens County, and from Metaline Falls, Pend Oreille County. The Gladstone mine near Northport was the largest producer in 1926, as it has been for several years, and the Electric Point, Old Dominion, Belle of May, and Grandview mines followed in order.

ZINC

The mine production of zinc in Washington in 1926 decreased 14 per cent in quantity. The Black Rock mine near Northport was the largest producer; the zinc concentrate was shipped to the electrolytic zinc plant near Great Falls, Mont. Some lead-zinc ore was mined at the Blue Ridge property near Northport, the Old Dominion mine east of Colville, and various mines at Metaline Falls, Pend Oreille County.

Mine production of gold, silver, copper, lead, and zinc in Washington, 1925–26, by counties

1925

County	Ore (short tons)	Gold (lode and placer)		Silver (lode and placer)	
		Fine ounces	Value	Fine ounces	Value
Chelan	1	3. 92	$81	1	$1
Ferry	8, 941	6, 473. 01	133, 809	41, 710	28, 947
Grant		2. 52	52	1	1
Kittitas	1	20. 75	429	5	3
Lewis	26	. 82	17	33	23
Okanogan	10	12. 48	258	1, 479	1, 026
Pend Oreille	914	1. 69	35	1, 043	724
Pierce		7. 55	156	1	1
Snohomish	19, 119	146. 72	3, 033	13, 702	9, 509
Stevens	14, 819	76. 58	1, 583	108, 206	75, 095
Whatcom	6, 456	4, 392. 45	90, 800	244	169
	50, 287	11, 138. 49	230, 253	166, 425	115, 499

County	Copper		Lead		Zinc		Total value
	Pounds	Value	Pounds	Value	Pounds	Value	
Chelan							$82
Ferry			1, 485	$129	17, 008	$1, 292	164, 177
Grant							53
Kittitas							432
Lewis	2, 712	$385					425
Okanogan	40	6	185	16			1, 306
Pend Oreille			757, 652	65, 916			66, 675
Pierce							157
Snohomish	1, 086, 561	154, 292					166, 834
Stevens	69, 744	9, 903	4, 867, 919	423, 509	1, 200, 838	91, 264	601, 354
Whatcom							90, 969
	1, 159, 057	164, 586	5, 627, 241	489, 570	1, 217, 846	92, 556	1, 092, 464

1926

County	Ore and old tailings (short tons)	Gold (lode and placer)		Silver (lode and placer)	
		Fine ounces	Value	Fine ounces	Value
Clallam		4. 55	$94		
Ferry	17, 597	7, 585. 30	156, 802	59, 160	$36, 916
King	60	86. 98	1, 798	882	550
Kittitas		1, 329. 34	27, 480	452	282
Okanogan	18	18. 33	379	188	117
Pend Oreille	813	4. 59	95	1, 818	1, 135
Pierce	7			5	3
Snohomish	25, 290	190. 98	3, 948	18, 451	11, 513
Stevens	10, 558	117. 94	2, 438	90, 693	56, 593
Whatcom		2. 81	58		
	54, 343	9, 340. 82	193, 092	171, 649	107, 109

County	Copper		Lead		Zinc		Total value
	Pounds	Value	Pounds	Value	Pounds	Value	
Clallam							$94
Ferry	179	$25	17, 568	$1, 405			195, 148
King	522	73					2, 421
Kittitas							27, 762
Okanogan	190	27	3, 312	265			788
Pend Oreille	117	16	326, 931	26, 155	65, 485	$4, 912	32, 313
Pierce	867	122					125
Snohomish	1, 347, 678	188, 675					204, 136
Stevens	2, 337	327	4, 198, 417	335, 873	978, 869	73, 415	468, 646
Whatcom							58
	1, 351, 890	189, 265	4, 546, 228	363, 698	1, 044, 354	78, 327	931, 491

Ore and old tailings sold or treated, lode mines producing, and average value of ore and old tailings in Washington, 1925–26, by counties

County	Ore and old tailings (short tons)		Lode mines producing		Average value per ton in all metals		Average value per ton in gold and silver	
	1925	1926	1925	1926	1925	1926	1925	1926
Chelan	1		1		$69.00		$69.00	
Ferry	8,941	17,597	3	9	18.36	$11.09	18.20	$11.01
King		60		1		40.35		39.13
Kittitas	1		1		15.00		15.00	
Lewis	26		1		16.35		1.54	
Okanogan	10	18	5	2	118.60	23.17	116.40	6.94
Pend Oreille	914	813	8	12	72.91	39.75	.79	1.51
Pierce		7		1		17.86		.43
Snohomish	19,119	25,290	1	2	8.71	8.07	.64	.61
Stevens	14,819	10,558	15	22	40.58	44.39	5.17	5.59
Whatcom	6,456		2		14.09		14.09	
	50,287	54,343	37	49	21.70	16.62	6.85	5.00

MINING INDUSTRY

In spite of the fact that general conditions seemed to favor active mining in Washington the results in terms of metals produced in 1926 were below normal. Metal prices were not greatly changed; the chief decreases were in the prices of silver and lead. Smelting plants in or near Washington were active: The copper plant at Tacoma received copper ore; the Bunker Hill smelter at Bradley, Idaho, was in the market for lead ore; the Consolidated Mining & Smelting Co. at Trail, British Columbia, required siliceous ore; and zinc material could be shipped to Great Falls, Mont., for reduction or to Portland, Oreg., for export. Custom mills for treating lead-zinc ore were operated at Troy and Butte, Mont., and several new mills were constructed or reconditioned locally. Considerable interest was reported in prospecting, and some substantial development was done in Chelan, Ferry, Pend Oreille, Snohomish, and Stevens Counties. There was a revival in mining in the Metaline district, Pend Oreille County, and at several camps in Stevens County. The output of the Republic district improved slightly, but the Knob Hill mine, a large producer since 1910, was closed in June.

The quantity of ore and old tailings sold or treated in Washington in 1926 increased 8 per cent, as siliceous ore from Republic, Ferry County, was needed at the smelter near Trail, British Columbia, and the output of copper ore near Index, Snohomish County, increased decidedly. The total average value declined from $21.70 in recovered metals a ton in 1925 to $16.62 in 1926, and the value in gold and silver from $6.85 to $5 a ton. Of the total output 47 per cent was copper ore and 32 per cent was gold ore and old tailings; lead ore, zinc ore, and lead-zinc ore followed in order of quantity.

A review of the production of ore and metals in Washington since 1913 shows that the gold was recovered chiefly from siliceous gold ore, and that the silver came mainly from siliceous ore and copper ore though of late much of it has come from lead ore. The production of copper was 2,645,022 pounds in 1916, but since that time the annual output has been comparatively small. Considerable lead was produced from 1898 to 1926 and zinc from 1916 to 1926, largely from the Northport region. In 1917 nearly 10,000,000 pounds of lead was produced. The output of metals in the last decade by sources follows:

Ore and old tailings sold or treated in Washington, 1917–1926, with content in terms of recovered metals

Year	Ore and old tailings	Gold	Silver	Copper	Lead	Zinc
DRY AND SILICEOUS ORE						
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
1917	65,639	23,240.61	120,510	51,391	4,483	
1918	47,151	14,107.36	156,772	14,448	23,095	
1919	29,086	12,016.93	104,980	2,463	143	
1920	13,096	5,549.82	45,977	2,073	1,743	
1921	20,199	6,015.38	68,991	3,293	3,339	
1922	24,782	8,830.87	106,243	2,189	17,759	
1923	33,499	16,348.92	127,029	349	4,467	
1924	17,575	14,706.15	70,178	510		
1925	15,383	10,876.19	43,083	16		
1926	17,599	7,707.83	56,556	522		
COPPER ORE						
1917	75,006	281.93	154,747	2,147,102		
1918	83,583	463.82	149,858	1,907,565		
1919	68,447	153.01	146,891	1,669,060		
1920	62,814	223.59	146,820	1,975,604		
1921	1,332	24.91	65,716	246,017		
1922	6,086	38.40	68,239	312,912	239	
1923	11,128	80.01	60,805	855,152		
1924	15,916	117.70	44,173	927,407		
1925	19,500	139.80	37,131	1,158,812		
1926	25,297	190.98	18,456	1,348,545		
LEAD ORE						
1917	16,407	1.55	5,630	535	9,739,302	
1918	8,125	.72	3,418	393	5,248,720	
1919	3,281	1.60	5,251	1,028	2,118,886	
1920	8,660	1.99	4,123		5,753,976	
1921	354	26.56	7,695	2,234	136,974	
1922	3,624	12.72	30,463	2,102	1,363,201	
1923	7,881	43.44	36,819	1,341	2,859,032	
1924	8,111	120.10	99,300	541	3,916,260	
1925	11,518	57.43	77,618	24	5,591,348	
1926	7,659	75.27	82,733	2,823	4,450,458	
COPPER-LEAD ORE						
1917–18						
1919	65	0.34	2,244	4,025	27,128	
1920	90		2,742	5,457	25,708	
1921–22						
1923	942	2.03	2,511	15,157	42,980	
1924–1926						
ZINC ORE AND LEAD-ZINC ORE						
1917	15,067	8.22	1,347	490	45,902	1,195,567
1918	52					38,873
1919						
1920	658				5,820	426,496
1921	1,000				3,240	449,360
1922	1,554		52			1,228,229
1923	3,450					3,024,535
1924	2,781		79		19,116	910,890
1925	3,886	12.20	8,582	205	35,893	1,217,846
1926	3,788	12.24	13,448		95,770	1,044,354

Ore and old tailings sold or treated in Washington, 1925–26, with content in terms of recovered metals

1925

Source	Mines producing	Ore		Gold		Silver	
		Short tons	Per cent	Fine ounces	Per cent	Fine ounces	Per cent
Dry gold ore	8	15,376	30.58	10,870.47	97.59	41,646	25.02
Dry silver ore	2	7	.01	5.72	.05	1,437	.86
Copper ore	3	19,500	38.78	139.80	1.26	37,131	22.31
Lead ore	21	11,518	22.90	57.43	.52	77,618	46.64
Zinc ore	3	3,646	7.25	3.50	.03	702	.42
Lead-zinc ore	2	240	.48	8.70	.08	7,880	4.74
Total, lode mines	[1] 37	50,287	100.00	11,085.62	99.53	166,414	99.99
Total, placers	9			52.87	.47	11	.01
	46	50,287	100.00	11,138.49	100.00	166,425	100.00

Source	Copper		Lead		Zinc	
	Pounds	Per cent	Pounds	Per cent	Pounds	Per cent
Dry gold ore	4					
Dry silver ore	12					
Copper ore	1,158,812	99.98				
Lead ore	24		5,591,348	99.36		
Zinc ore			5,472	.10	1,128,262	92.64
Lead-zinc ore	205	.02	30,421	.54	89,584	7.36
	1,159,057	100.00	5,627,241	100.00	1,217,846	100.00

1926

Source	Mines producing	Ore and old tailings		Gold		Silver	
		Short tons	Per cent	Fine ounces	Per cent	Fine ounces	Per cent
Dry gold ore	9	[2] 17,599	32.39	7,707.83	82.52	56,556	32.95
Copper ore	3	25,297	46.55	190.98	2.04	18,456	10.75
Lead ore	30	7,659	14.09	75.27	.81	82,733	48.20
Zinc ore	2	3,185	5.86				
Lead-zinc ore	10	603	1.11	12.24	.13	13,448	7.83
Total, lode mines	[1] 49	54,343	100.00	7,986.32	85.50	171,193	99.73
Total, placers	9			1,354.50	14.50	456	.27
	58	54,343	100.00	9,340.82	100.00	171,649	100.00

Source	Copper		Lead		Zinc	
	Pounds	Per cent	Pounds	Per cent	Pounds	Per cent
Dry gold ore	522	0.04				
Copper ore	1,348,545	99.75				
Lead ore	2,823	.21	4,450,458	97.89		
Zinc ore					861,904	82.53
Lead-zinc ore			95,770	2.11	182,450	17.47
	1,351,890	100.00	4,546,228	100.00	1,044,354	100.00

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[1] A mine producing more than one class of ore is counted but once in arriving at total for all classes.

[2] Includes 1,843 tons of old tailings sold to a smelter.

Value of metals from ore and old tailings sold or treated in Washington in 1926, by kinds of ore

Kind of ore	Ore and old tailings (short tons)	Gold	Silver	Copper	Lead	Zinc	Total
Dry gold ore	17, 599	$159, 335	$35, 291	$73			$194, 699
Copper ore	25, 297	3, 948	11, 516	188, 797			204, 261
Lead ore	7, 659	1, 556	51, 625	395	$356, 037		409, 613
Zinc ore	3, 185					$64, 643	64, 643
Lead-zinc ore	603	253	8, 392		7, 661	13, 684	29, 990
	54, 343	165, 092	106, 824	189, 265	363, 698	78, 327	903, 206
Total, 1925	50, 287	229, 160	115, 491	164, 586	489, 570	92, 556	1, 091, 363

The gold ore in 1926, as for several years past, was largely siliceous smelting ore mined at Republic, and was nearly double the output of 1925. The total value of metals recovered from gold ore and old tailings was $194,699, an average of $9.05 in gold and 3.21 ounces of silver to the ton.

No silver ore was marketed in 1926, nor was any gold-silver ore shipped.

The metals recovered from copper ore were valued at $204,261. Nearly all the copper ore came from Index, Snohomish County, and was largely milling ore; it yielded on the average $0.16 in gold and 0.73 ounce of silver to the ton and 2.67 per cent of copper.

The metals recovered from lead ore were valued at $409,613. The ore came mainly from Stevens County and most of it was smelting ore from mines near Northport, which contained very little silver; it yielded on the average $0.20 in gold and 10.80 ounces of silver to the ton, 29.05 per cent of lead, and a little copper.

The metals recovered from zinc ore were valued at $64,643. Nearly all the zinc ore was of milling grade and it came from Stevens County; the milling ore averaged 13.35 per cent of recoverable zinc before concentration.

The lead-zinc ore—603 tons—yielded on the average $0.42 in gold and 22.30 ounces of silver to the ton, 7.94 per cent of lead, and 15.13 per cent of zinc.

Ore and old tailings sold or treated in Washington, 1925–26, by counties, with content in terms of recovered metals

1925

DRY GOLD ORE

County	Ore and old tailings	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Chelan	1	3. 30	1			
Ferry	8, 916	6, 473. 00	41, 400			
Kittitas	1	. 75				
Okanogan	2	. 96	1	4		
Whatcom	6, 456	4, 392. 46	244			
	15, 376	10, 870. 47	41, 646	4		

Ore and old tailings sold or treated in Washington, 1925–26, by counties, with content in terms of recovered metals—Continued

1925—Continued

COPPER ORE

County	Ore and old tailings	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Lewis	26	0. 80	33	2, 712	----------	----------
Snohomish	19, 119	132. 00	13, 699	1, 086, 561	----------	----------
Stevens	355	7. 00	23, 399	69, 539	----------	----------
	19, 500	139. 80	37, 131	1, 158, 812	----------	----------

LEAD ORE

Okanogan	1	0. 06	40	24	185	----------
Pend Oreille	914	----------	1, 043	----------	757, 652	----------
Stevens	10, 603	57. 37	76, 535	----------	4, 833, 511	----------
	11, 518	57. 43	77, 618	24	5, 591, 348	----------

1926

DRY GOLD ORE

Ferry	[1] 17, 489	7, 583. 50	55, 641	----------	----------	----------
King	60	86. 98	882	522	----------	----------
Stevens	50	37. 35	33	----------	----------	----------
	17, 599	7, 707. 83	56, 556	522	----------	----------

COPPER ORE

Pierce	7	----------	5	867	----------	----------
Snohomish	25, 290	190. 98	18, 451	1, 347, 678	----------	----------
	25, 297	190. 98	18, 456	1, 348, 545	----------	----------

LEAD ORE

Ferry	108	1. 84	3, 519	179	17, 568	----------
Okanogan	18	. 48	184	190	3, 312	----------
Pend Oreille	530	----------	537	117	285, 570	----------
Stevens	7, 003	72. 95	78, 493	2, 337	4, 144, 008	----------
	7, 659	75. 27	82, 733	2, 823	4, 450, 458	----------

LEAD-ZINC ORE

Pend Oreille	283	4. 60	1, 281	----------	41, 361	65, 485
Stevens	320	7. 64	12, 167	----------	54, 409	116, 965
	603	12. 24	13, 448	----------	95, 770	182, 450

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[1] Includes 1,843 tons of old tailings sold to a smelter.

The following table gives the kind and grade of zinc material marketed in 1925 and 1926:

Zinc ore, lead-zinc ore, and zinc concentrates (as marketed from Washington mines and mills) sold to smelters, 1925–26

Classification	County	Quantity (dry weight)	Gross zinc	Average assay of ore or concentrate	Recovered zinc
1925		*Short tons*	*Pounds*	*Per cent*	*Pounds*
Sulphide zinc ore	Ferry and Stevens	93	63, 567	34. 18	50, 854
Zinc concentrates	Stevens	1, 133	1, 306, 360	57. 65	1, 166, 992
		1, 226	1, 369, 927	55. 87	1, 217, 846
1926					
Oxidized zinc ore	Stevens	35	26, 800	38. 29	20, 904
Sulphide lead-zinc ore	do	35	25, 000	35. 71	21, 250
Zinc concentrates	Stevens and Pend Oreille	1, 078	1, 175, 745	54. 53	1, 002, 200
		1, 148	1, 227, 545	53. 46	1, 044, 354

METALLURGIC INDUSTRY

In 1926 no ore was treated by amalgamation or cyanidation, the total being made up of ore concentrated, crude ore shipped for smelting, and old tailings smelted.

Four milling plants, all concentration mills, in Washington were active in 1926. One used flotation, two table concentration, and one a combination of flotation and table concentration. A list of the ore-milling plants, with details of their equipment, in Washington in 1925, prepared by the Bureau of Mines, may be had upon request.

Ore and concentrates from mines in Washington were smelted mainly at Bradley, Idaho; Tacoma, Wash.; East Helena, Mont.; and Trail, British Columbia. Lead ore and concentrate were smelted at the Bunker Hill plant at Bradley, Idaho; copper material at Tacoma, Wash.; and siliceous ore at Trail, British Columbia. Zinc concentrate was roasted and leached near Great Falls, Mont., and some mixed lead-zinc ore was milled at the Timber Butte custom mill at Butte, Mont., and the Snow Storm mill at Troy, Mont. An unusually complete plant for milling, smelting, and refining was operated at Trail, British Columbia. The Consolidated Mining & Smelting Co. treated company ore and custom material, all refining being done locally. The works were fully described [2] in 1923, but changes, especially in the electrolytic zinc plant, have since been made.

Fifty-five per cent of the total ore was concentrated and yielded 3,182 tons of concentrates, of which more than half was copper concentrate and nearly all the remainder zinc concentrate. The increase in copper concentrate more than offset the decreases in lead and zinc concentrates.

Forty-five per cent of the total ore was shipped crude to smelters; two-thirds of it came from Ferry County and nearly all the remainder came from Stevens County. Of the shipping ore 67 per cent was dry and siliceous ore and 31 per cent was lead ore. First-class lead ore decreased somewhat whereas siliceous ore increased more than 75 per cent, as compared with 1925.

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[2] Young, G. J., Eng. and Min. Jour.-Press, vol. 116, July 28, 1923, p. 139.

In addition to the crude ore, 1,843 tons of old tailings were shipped to smelters in 1926.

Mine production of metals from Washington concentrates in 1926

BY COUNTIES

	Ore to concentrating mills	Concentrates and recovered metal						
		Concentrates produced	Gold	Silver	Copper	Lead	Zinc	Total value of metal
	Short tons	*Short tons*	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*	
Ferry	50	10	0.38	234	----------	2,171	----------	$327
Pend Oreille	463	159	4.57	1,371	----------	94,799	65,485	13,445
Snohomish	24,868	1,961	167.00	16,357	1,220,990	----------	----------	184,598
Stevens	3,455	1,052	7.96	12,441	38	47,059	936,715	81,951
	28,836	3,182	179.91	30,403	1,221,028	144,029	1,002,200	280,321
Total, 1925	25,406	3,128	147.40	29,835	1,047,279	286,343	1,166,992	286,069

BY KINDS OF CONCENTRATES

Copper	1,961	167.00	16,357	1,220,990	----------	----------	$184,598
Lead	143	10.17	9,371	38	134,615	----------	16,831
Zinc	1,078	2.74	4,675	----------	9,414	1,002,200	78,892

AVERAGE RECOVERABLE CONTENT

	Short tons	*Fine ounces per ton*	*Fine ounces per ton*	*Per cent*	*Per cent*	*Per cent*	*Value per ton*
Copper	1,961	0.09	8.34	31.13	----------	----------	$94.13
Lead	143	.07	65.53	.01	47.07	----------	117.70
Zinc	1,078	----------	4.34	----------	.44	46.48	73.18
	3,182	.06	9.55	19.19	2.26	15.75	88.09
Total, 1925	3,128	.05	9.54	16.74	4.58	18.65	91.45

Mine production of metals from Washington crude ore shipped to smelters in 1926

BY COUNTIES

	Ore	Gold	Silver	Copper	Lead	Zinc	Total value of metal
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*	
Ferry	15,704	7,047.77	57,439	179	15,397	----------	$182,789
King	60	87.00	882	522	----------	----------	2,421
Okanogan	18	.51	184	190	3,312	----------	418
Pend Oreille	350	----------	447	117	232,132	----------	18,865
Pierce	7	----------	5	867	----------	----------	125
Snohomish	422	24.00	2,094	126,688	----------	----------	19,539
Stevens	7,103	109.98	78,252	2,299	4,151,358	42,154	386,696
	23,664	7,269.26	139,303	130,862	4,402,199	42,154	610,853
Total, 1925	18,423	6,544.63	136,335	111,778	5,340,898	50,854	714,302

BY KINDS OF ORE

Dry and siliceous	15,756	7,170.66	55,069	522	----------	----------	$182,667
Copper	429	24.00	2,099	127,555	----------	----------	19,664
Lead	7,409	74.20	81,925	2,785	4,393,338	----------	404,512
Zinc	35	----------	----------	----------	----------	20,904	1,568
Lead-zinc	35	.40	210	----------	8,861	21,250	2,442

Mine production of metals from Washington crude ore shipped to smelters in 1926—Continued

AVERAGE RECOVERABLE CONTENT

	Ore	Gold	Silver	Copper	Lead	Zinc	Total value of metal
	Short tons	*Fine ounces per ton*	*Fine ounces per ton*	*Per cent*	*Per cent*	*Per cent*	*Value per ton*
Dry and siliceous	15,756	0.46	3.50				$11.59
Copper: Sulphide	429	.06	4.89	14.87			45.84
Lead:							
Oxidized	4,947		.47		22.46		36.22
Sulphide	2,462	.03	32.33	.06	44.10		91.51
Zinc, oxidized	35					29.86	44.80
Lead-zinc: Sulphide	35	.01	6.00		12.66	30.36	69.77
	23,664	.31	5.89	.28	9.30	.09	25.81
Total, 1925	18,423	.36	7.40	.30	14.50	.14	38.77

REVIEW BY COUNTIES AND DISTRICTS

CHELAN COUNTY

Interesting development work was continued in the Leavenworth district by the Royal Development Co., which owns more than 100 claims on Red Mountain. The Trinity tunnel was driven an additional 2,080 feet in 1926 toward what is reported as a large deposit of low-grade ore containing copper, silver, and gold. An article[3] published in 1926 describes the occurrence of chalcopyrite and pyrrhotite in a wide zone and states that 30 feet of lepidolite (lithia mica) was cut in the tunnel.

CLALLAM COUNTY

A little placer gold was recovered from the beach sands near Ozette by the Coast Mining Co. In the central part of the county, in the Olympic Mountains, commercial manganese ore occurs in considerable quantity at the Crescent mine.

FERRY COUNTY

Keller district.—Three lode mines in the Keller district produced 108 tons of ore, yielding $37 in gold, 3,519 ounces of silver, 179 pounds of copper, and 17,568 pounds of lead, valued in all at $3,663, or $33.92 in metals a ton. One lot of sulphide silver-lead ore was shipped from the Gold Hill property, owned by the Columbia Silver Mines Co., and a small lot of oxidized lead ore was shipped from the Shamrock property. During development one car of lead ore came from the Iron Creek property, where it is planned to block out sufficient ore to justify changes in the milling plant.

Republic district.—Six lode mines in the Republic district produced gold and silver valued at $191,485, an increase of $28,944. As in recent years, all the ore was shipped to Trail, British Columbia, to be used as a silica flux. From 1896 to the end of 1926 the district produced 637,991 tons of ore and old tailings, yielding $8,066,013 in gold and 2,390,562 ounces of silver, valued together at $9,579,136. The large producers of the district in 1926 were the Quilp and Last Chance mines, each of which produced more than 6,000 tons of siliceous gold ore. The Last Chance property, owned by the Lone Pine-Surprise Consolidated Mining Co., was unwatered in May and shipments began August 13. The Quilp mine was active the entire year and the ore, which was shipped to Trail, British Columbia, yielded on the average about $10 in gold and 3 ounces of silver to the ton. Several lots of rich gold ore were shipped from the Knob Hill property, but attempts to find more ore proved unsuccessful and the mine was closed June 1. The remainder of the district output comprised several lots of gold ore from the Old Hickory and Surprise mines and nearly 2,000 tons of low-grade siliceous tailings originally from the Republic mill. Lessees operated the Surprise-Lone Pine-Pearl property of the Northport Smelting & Refining Co., but the production was unusually small.

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[3] MacPhee, R. G., "Lepidolite discovered near Leavenworth, Wash.": Eng. and Min. Jour. vol. 122, Sept 18, 1926, p. 468

KING COUNTY

Miller River district.—The Apex mine near Miller River produced several cars of gold ore that was shipped to Tacoma for smelting. The ore also contains about 20 per cent of arsenic, but the price of refined arsenic has not justified the installation of special machinery for its recovery.

KITTITAS COUNTY

Cle Elum district.—A 10-foot vein of ore containing gold, silver, copper, and zinc was being developed at the Rainbow group near Roslyn.

Swauk district.—Four placers in the Swauk district produced $27,480 in gold and 452 ounces of silver, valued together at $27,762. Most of the output was that of the Kittitas Gold Mining Co., which operated an electric dredge equipped with 63 buckets, each having a capacity of 7½ cubic feet. The property is on Swauk Creek 15 miles from Cle Elum, and the plant was run from February to August. Placer gold was also recovered at the Little May and other placers near Liberty.

OKANOGAN COUNTY

Conconully district.—One small lot of silver-lead ore was shipped from the Peacock Silver property.

Nespelem district.—A test lot of lead ore was shipped from the Apache property, formerly a large producer.

Park City district.—A little placer gold was recovered from the Little Nugget claim on Strawberry Creek, south of Republic.

Similkameen district.—A little placer gold was recovered from the Slate Rock and other placer property near Oroville.

PEND OREILLE COUNTY

In 1926 the output of each metal in Pend Oreille County increased except lead, which is the chief product, but the total value of the metal output decreased $34,362 as a result of curtailed shipments from Metaline Falls.

Metaline district.—Twelve lode mines in the Metaline district produced 813 tons of ore, $95 in gold, 1,818 ounces of silver, 117 pounds of copper, 326,931 pounds of lead, and 65,485 pounds of zinc, valued in all at $32,313, or $39.75 in metals a ton. The output consisted of 350 tons of first-class lead ore shipped for smelting, and 463 tons of milling ore which was reduced to 159 tons of concentrates. Most of the ore came from the Belle of May group and the Grandview property. Several cars of first-class lead ore, as well as some lead-zinc ore for custom milling, were shipped from the Z Canyon group 10 miles north of Metaline Falls, acquired by the Pend Oreille Lead & Zinc Co. The 50-ton flotation plant at the Grandview mine produced one car of lead concentrate. Other producers in the district were the Lead King, Lone Star, Josephine, Lucky Strike, Mohawk, Oriole, Sullivan, and Sterling Silver properties. Part of the lead-zinc milling ore was shipped to the Snow Storm custom mill at Troy, Mont., and part to the Timber Butte mill at Butte, Mont. Early in 1927 a large acreage, including the Josephine, Hortense, and Washington groups, was being worked by the Pend Oreille Lead & Zinc Co., which later ran the mill that was active in 1916 and 1917.

PIERCE COUNTY

Operations were continued throughout the year at the custom smelter and refinery of the American Smelting & Refining Co. at Tacoma. Details [4] of the plant, which has blast furnaces, reverberatory, converters, electrolytic refinery, and arsenic plant, were published in 1925. In 1926 the charge consisted chiefly of ore received from British Columbia, Alaska, and South America, but some custom material was received from California and Oregon and from mines in Washington, largely from Index.

Glacier Basin district.—A test lot of copper ore was shipped from the Mount Rainier property, near Enumclaw.

SNOHOMISH COUNTY

Index district.—The chief producer of the Index district was the Sunset Copper Co., which ran its 150-ton concentration-flotation plant from February 15 to December 20. Several hundred tons of first-class copper ore was shipped to the smelter, but the greater part of the output was milling ore which was reduced to about 2,000 tons of copper concentrate. The mine was the largest producer of copper in the State; about 800 feet of drifting was done in 1926. The ore minerals are chalcopyrite and bornite, occurring in a series of shear zones in granite. A gyratory crushing and sorting plant was installed in 1926 to increase the capacity of the mill, and a reservoir was built to insure sufficient water during the summer season. Concentrates are shipped by a logging railroad 7 miles to Index, on the Great Northern Railroad.

Sampson district.—The Glacier Peak Mining & Smelting Co. did some development in drifts and tunnels on a wide vein of copper ore. Much ore is reported in sight, but transportation facilities are lacking.

STEVENS COUNTY

The value of the mine production of metals in Stevens County in 1926 decreased $132,708 but was more than half the total for the State. There was a small increase in the output of gold but large decreases in silver, copper, lead, and zinc. The ore deposits have been described by the United States Geological Survey and in a State publication [5] which gives notes on ore occurrence at the large producers of the Northport, Colville, and other districts.

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[4] Young, G. J., "The Tacoma copper smelter and refinery": Eng. and Min. Jour.-Press, vol. 119, Apr. 4, 1925, p. 557.

Chewelah district.—One small lot of lead ore was shipped from the Eagle property, owned by the Blue Star Mining Co. No shipments were made from the United Silver-Copper mine, which was one of the largest producers in Washington from 1912 to 1923, but the property was reorganized to include the adjoining Amazon mine and shipments will probably be resumed in 1927. High-grade silver-copper ore occurring as chalcopyrite and tetrahedrite is opened at a depth of 225 feet.

Colville and Clugsten Creek district.—Five lode mines in the Colville district produced 928 tons of ore, yielding $1,640 in gold, 87,074 ounces of silver, 2,077 pounds of copper, 219,664 pounds of lead, and 51,304 pounds of zinc, valued in all at $77,686, or $83.71 in metals a ton. Nearly all the ore was first-class silver-bearing lead ore which was smelted; 180 tons of ore was milled at custom plants and yielded lead concentrate and zinc concentrate. The largest producer was the Old Dominion mine near Colville, where rich silver-lead ore was mined from irregular replacement deposits in limestone. Some of the ore containing lead and zinc was shipped to the Bunker Hill custom mill at Sweeny, Idaho. As the ore bodies failed about 200 feet below the main tunnel, the lower workings were abandoned and the mine closed December 14. The crude ore yielded on the average more than 100 ounces of silver to the ton and about 13 per cent of lead. Small lots of lead ore were shipped from the Uncle Sam and Chloride Queen groups, north of Colville, and some lead-zinc ore from the Shumaker-Campbell property was shipped to Troy, Mont. Prospecting was done at the Lucky Stone and New Leadville properties.

Northport district.—Thirteen lode mines in the Northport district produced 9,569 tons of ore, yielding $20 in gold, 3,370 ounces of silver, 66 pounds of copper, 3,968,321 pounds of lead, and 927,565 pounds of zinc, valued in all at $389,165, or $40.67 in metals a ton. Of this ore, 6,294 tons was first-class smelting ore and 3,275 tons was milled to make 970 tons of concentrates. About half the ore mined in the district was that of the Gladstone Mountain Mining Co., who produced oxidized and sulphide lead ore that was shipped to Bradley, Idaho, and Carnegie, Pa. The company produced more than 3,000,000 pounds of lead and paid dividends amounting to $92,532 in 1926, or $158,627 to date. No milling was done, but the output was separated into a high-grade sulphide ore which was shipped east and an oxidized ore which was smelted at Sweeny, Idaho. The company's annual report for 1926 gives the following paragraphs:

> During the year 1926 the company shipped 1,146 dry tons of sulphide lead ore, averaging 74.61 per cent of lead, and 3,611 dry tons of carbonate ore, averaging 22.62 per cent of lead. Total net smelter returns were $181,160.
>
> Regular monthly dividends of one-half cent per share were paid with an extra half cent in July and October, making a total for the year of 7 cents per share. * * *
>
> New developments on the west end, where numerous surface discoveries were made last year, may prove interesting in the next few months. A well-timbered shaft has been sunk to the 200-foot level and laterals are now being run. * * *
>
> The past year has been the worst in history for ore hauling. Continuous rains and soft roads prevented the movement of ore for a considerable period. * * *

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[5] Jenkins, O. P., Lead Deposits of Pend Oreille and Stevens Counties, Washington: Washington State Dept. Conservation and Development Bull. 31, 1924.

Total receipts were $184,329 and operating profit was $92,411, after deducting $56,928 for mining, $26,498 for hauling, and $8,491 for general expenses.

The Black Rock mine was operated continuously but the concentration mill ran only about one-third of the year; several thousand tons of zinc ore was milled, and the resulting concentrates were shipped to the electrolytic leaching plant at Black Eagle, near Great Falls, Mont. More than 1,000 tons of low-grade lead ore was cleaned up from the Electric Point property and shipped to the Bunker Hill smelter at Bradley, Idaho; the mine has been a large producer and dividend payer in the past, and the difficulty with the Treasury Department regarding past taxes has finally been settled. One car of lead ore and a car of zinc ore were shipped from the Great Western group, and a little lead-zinc ore was shipped from the King Tut and Emerald properties for milling. Three cars of lead-zinc ore, mined while a lower tunnel was being driven at the Blue Ridge property, were shipped; most of the ore was treated by flotation at Butte, Mont. An 800-foot tunnel was driven at the Red Top strike, 3 miles from the Gladstone property; lead ore of shipping and milling grades was opened and some scheelite (calcium tungstate) was found to occur with the galena. Other producers of lead ore were the Last Chance, Lead Trust, Myecrah, Silver Crown, and United Treasure properties.

Orient district.—One car of rich gold ore was shipped from the Princess property near Laurier, and one lot of iron ore containing some gold and silver was shipped from the Big Iron property to East Helena, Mont. Low-grade ore was being developed at the First Thought mine, a large producer in the past.

Springdale district.—The mill at the Santa Rita property, a producer of lead ore in 1925, was idle in 1926. The new flotation and cyanidation plant of the Venus Silver Mines Co. was not completed; the company reports large reserves of silver ore. Copper ore of good grade occurs at the Togo mine of the Consolidated Copper Co., but the haul to the railroad is expensive.

Summit district.—The Consolidated Silver Mountain Mines Co. reports ore containing silver, lead, zinc, and arsenic. Although there is a concentration mill and a roaster at the mine the company has not succeeded in making satisfactory products. The Tempest group, on which high-grade silver ore was found, was consolidated with the Silver Mountain property.

Valley district.—No shipments were made from the Double Eagle or Admiral mines; 300 feet of shaft sinking was done at the Admiral property, where some copper ore is developed.

WHATCOM COUNTY

Mount Baker district.—The Boundary Red Mountain mine, south of Sardis, British Columbia, an important producer of gold in the past, was not productive in 1926; the 10-stamp mill was idle, but 1,300 feet of development was done and connection made between the 500 and 1,200 foot levels for ventilation purposes. The Lone Jack mine of the Brooks-Willis Metals (Inc.) was idle.

Slate Creek district.—A small quantity of gold was recovered from a placer property in the Slate Creek district; the lode mines were not worked.

GOLD, SILVER, COPPER, LEAD, AND ZINC IN UTAH

(MINE REPORT)

By C. N. GERRY[1]

SUMMARY

The output of gold, silver, copper, lead, and zinc from Utah mines in 1926 was valued at $82,662,884, a slight decrease ($38,510) in comparison with 1925. There were 164 lode mines and 2 placers producing compared with 179 lode mines and no placers in 1925. The output of ore and the quantity and value of each metal except silver and lead increased considerably. The value of gold increased $102,530, copper increased 20,977,942 pounds, and zinc increased 42,567,648 pounds. Silver decreased from 21,276,689 ounces to 19,358,581 ounces, and lead from 306,669,824 pounds to 295,270,025 pounds. Compared with other States, Utah was first in the output of silver in 1926, and second in copper and lead. Salt Lake County, which includes the Bingham district, again led in total value of metal output in 1926 as well as in the production of gold, copper, lead, and zinc. Juab County, which includes the older part of the Tintic district, was again second in the value of the five metals and first in the output of silver.

Since 1864, Utah has yielded an output of the five metals, as follows: Gold, $117,867,487; silver, 510,782,591 fine ounces; copper, 3,516,893,100 pounds; lead, 5,671,093,475 pounds; and zinc, 405,818,786 pounds. The total value of this output has been $1,457,629,411.

Published dividends of 14 producers amounted to $15,270,498 in 1926, making a recorded total of $279,071,369 paid to stockholders since mining became profitable. Nearly 19 per cent of the value of the metal output in 1926 was paid in dividends, and more than 19 per cent of the metal output since 1864 has been paid in dividends.

The dividends stated above for 1926 do not include $2,931,127 paid by the United States Smelting, Refining & Mining Co., which controls mines at Eureka and Bingham, Utah, in other States, and in Mexico. The 14 companies that contributed to the total dividends in 1926 were the Utah Copper, Tintic Standard, Silver King Coalition, Park Utah Consolidated, Utah-Apex, Chief Consolidated, Plutus, Mammoth, Utah-Delaware, Bingham Mines, Ohio Copper, Keystone, Eagle & Blue Bell, and Horn Silver.

The prices given in the table that follows are those at which the values for metals in this report have been calculated. The silver prices for 1917 and 1919 are dealers' buying price, New York; for 1918, average price as stated by the Bureau of the Mint; for 1920 to 1922, New York market price for domestic silver only; for 1923, average price under the Pittman Act, from January 1 to June 2, for domestic silver, and average New York price for all silver after that period; for 1924 and later years, average New York price for bar silver. The copper, lead, and zinc prices are weighted averages, for each year, of all grades of primary metal sold by producers.

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[1] The valuable assistance of B. N. Lowry and Paul Luff, of the Bureau of Mines, is acknowledged.

Prices of silver, copper, lead, and zinc, 1917–1926

Year	Silver	Copper	Lead	Zinc	Year	Silver	Copper	Lead	Zinc
	Per fine ounce	*Per pound*	*Per pound*	*Per pound*		*Per fine ounce*	*Per pound*	*Per pound*	*Per pound*
1917	$0.824	$0.273	$0.086	$0.102	1922	$1.00	$0.135	$0.055	$0.057
1918	1.00	.247	.071	.091	1923	.82	.147	.070	.068
1919	1.12	.186	.053	.073	1924	.67	.131	.080	.065
1920	1.09	.184	.080	.081	1925	.694	.142	.087	.076
1921	1.00	.129	.045	.050	1926	.624	.140	.080	.075

Mine production of gold, silver, copper, lead, and zinc in Utah, 1917–1926

Year	Mines producing		Ore, old tailings, etc. (short tons)	Gold		Silver	
	Lode	Placer		Fine ounces	Value	Fine ounces	Value
1917	331	3	15,358,481	162,305.67	$3,355,156	13,479,133	$11,106,806
1918	248	3	14,705,718	142,666.10	2,949,170	13,455,597	13,455,597
1919	179		6,745,423	104,464.41	2,159,471	11,649,961	13,047,956
1920	161	3	6,800,180	97,454.15	2,014,556	13,106,976	14,286,604
1921	134	4	2,137,522	85,619.15	1,769,905	12,251,998	12,251,998
1922	147	7	5,560,034	111,110.36	2,296,855	17,271,100	17,271,100
1923	146	4	12,752,998	148,824.86	3,076,483	19,137,470	15,692,725
1924	136	2	13,640,618	146,486.85	3,028,152	17,253,692	11,559,974
1925	179		14,479,247	177,803.08	3,675,516	21,276,689	14,766,022
1926	164	2	15,856,144	182,762.98	3,778,046	19,358,581	12,079,755

Year	Copper		Lead		Zinc		Total value
	Pounds	Value	Pounds	Value	Pounds	Value	
1917	246,674,153	$67,342,044	178,521,958	$15,352,888	21,286,871	$2,171,261	$99,328,155
1918	227,169,630	56,110,899	167,008,224	11,857,584	18,399,417	1,674,347	86,047,597
1919	124,061,807	23,075,496	123,829,051	6,562,940	4,431,024	323,465	45,169,328
1920	116,931,238	21,515,348	140,838,113	11,267,049	8,157,739	660,777	49,744,334
1921	30,891,403	3,984,991	89,187,269	4,013,427	69,390	3,469	22,023,790
1922	97,193,850	13,121,170	135,332,144	7,443,268	5,119,410	291,806	40,424,199
1923	222,393,572	32,691,855	203,447,793	14,241,346	11,330,913	770,502	66,472,911
1924	242,138,165	31,720,100	233,910,875	18,712,870	18,562,172	1,206,541	66,227,637
1925	236,486,540	33,581,089	306,669,824	26,680,275	52,611,732	3,998,492	82,701,394
1926	257,464,482	36,045,027	295,270,025	23,621,602	95,179,380	7,138,454	82,662,884

GOLD

The mine production of gold in Utah in 1926 increased 3 per cent over 1925; most of it came from Salt Lake, Juab, Wasatch, Utah, and Summit Counties, here named in order of output. The gain was particularly noticeable in Salt Lake and Wasatch Counties and was due to the increased output of copper ore and lead-zinc ore.

In Utah gold is produced almost entirely as a by-product in the smelting of copper, lead, and lead-zinc ores and concentrates. The Utah Copper property at Bingham was the largest producer of gold in Utah in 1926, the Bingham property of the United States Smelting, Refining & Mining Co. was second, and the Park Utah Consolidated, Mammoth tailing dump, Chief Consolidated, Utah-Delaware, Utah-Apex, Tintic Standard, Silver King Coalition, and Bingham mines followed.

SILVER

In 1926 Utah was again the largest producer of silver in the United States, although the quantity decreased 9 per cent from the record output of 1925. Juab County once more led in output, followed by Salt Lake, Wasatch, and Utah Counties. The decrease was especially noticeable in the Tintic and Park City districts. Most of the silver was recovered from the smelting of crude ore and concentrates; no silver bullion or precipitates were marketed, as the chloridizing-roasting mill of the Tintic Standard Mining Co. was idle. Ten properties each produced more than 700,000 ounces of silver in 1926. These properties were the Park Utah Consolidated in the Park City region, the Tintic Standard in the Tintic district, the Silver King Coalition in the Park City region, the Chief Consolidated and Plutus in the Tintic district, the property of the United States Smelting, Refining & Mining Co. and the Utah Copper Co. at Bingham, the Mammoth in the Tintic district, the Ontario in the Park City region, and the Utah-Apex at Bingham.

COPPER

In 1926 Utah was the second largest producer of copper in the United States, and the output was the largest ever made in the State. Nearly 97 per cent of the copper came from the Bingham or West Mountain district, Salt Lake County; the outputs of the Tintic district, Juab County, and the Park City region, Summit and Wasatch Counties, followed.

Crude ore shipped to smelters yielded 10,951,752 pounds of copper, against 9,944,242 pounds in 1925. Of the copper from crude copper ore smelted 5,483,495 pounds were produced from sulphide ores and 192,952 pounds from oxidized ores; of the lead ores smelted sulphide ores yielded 3,373,598 pounds of copper and oxidized ores 584,406 pounds. The dry and siliceous ore, used chiefly as a flux at smelting plants, yielded 1,317,301 pounds, against 2,372,869 pounds in 1925. The low-grade disseminated ores that were concentrated yielded 233,465,293 pounds of copper, against 213,446,624 pounds in 1925.

The leading copper producers in Utah in 1926 were, in order of output, the Utah Copper Co. (which reported 234,173,625 net pounds), Ohio Copper, Utah-Apex, Utah-Delaware, Mammoth tailing dump, Chief Consolidated, Park Utah Consolidated, and the Bingham property of the United States Smelting, Refining & Mining Co. The Ohio Copper Co. at Lark continued to leach in place the caved area of the mine, but the yield was greatly decreased.

LEAD

In 1926 Utah again ranked second among the States as a producer of lead, although the quantity decreased nearly 4 per cent from the record output of 1925. The milling of much low-grade mixed ore, especially at International and Midvale, resulted in a large increase in lead from lead-zinc ore; this increase, however, was not so great as the decrease in lead from lead ore.

The Bingham or West Mountain district produced 109,993,099 pounds of lead, compared with 109,964,255 pounds in 1925; most of the lead output at Bingham came from the Utah-Apex mine, the Utah-Delaware mine, and the property of the United States Smelting, Refining & Mining Co. The Park City region produced 71,819,276 pounds, against 81,312,417 pounds in 1925; the Tintic district produced 94,216,430 pounds, against 91,778,506 pounds; the combined production of the Ophir and Rush Valley districts, Tooele County, decreased from 10,819,994 pounds to 10,478,961 pounds; the output in Beaver County decreased from 5,024,565 pounds to 4,180,434 pounds; and the combined production of the Big and Little Cottonwood districts, Salt Lake County, decreased from 4,748,256 pounds to 3,194,890 pounds.

The Tintic Standard property in the Tintic district ranked first in lead output in Utah in 1926. It was followed in order by the Park Utah Consolidated in the Park City region, the Utah-Apex and the property of the United States Smelting, Refining & Mining Co. at Bingham, the Silver King Coalition at Park City, the Utah-Delaware at Bingham, and the Chief Consolidated mines in the Tintic district. Each of these was credited with producing more than 20,000,000 pounds of lead. Next in rank were the Bingham Mines Co., Plutus, Bullion Coalition, Mammoth, and Eagle & Blue Bell mines.

ZINC

The mine production of zinc in Utah in 1926 was the largest ever recorded, exceeding by 80 per cent the former record—that of 1925. There was a very slight decrease in the average price of zinc in 1926, and the increase in production was the result of the work at the flotation plants at International, Midvale, Bauer, Eureka, Bingham, and Park City. The new 800-ton custom flotation plant at Midvale was active from March to December. The increase in zinc recovered from ores mined in the Bingham, Park City, and Tintic districts of Utah was notable. Custom ore from other States was treated at Bauer, Midvale, and International.

The mines of the United States Smelting, Refining & Mining Co. at Bingham ranked first in zinc output in Utah in 1926, followed closely by the Park Utah Consolidated mines in the Park City region. Other large zinc producers were the Utah-Delaware, Utah-Apex, Chief Consolidated, Silver King Coalition, Bullion Coalition, Bingham Mines, and Ontario Silver properties.

Mine production of gold, silver, copper, lead, and zinc in Utah, 1925 and 1926, by counties

1925

County	Ore, old tailings, etc. (short tons)	Gold		Silver	
		Fine ounces	Value	Fine ounces	Value
Beaver	56,577	1,601.84	$33,113	274,549	$190,537
Box Elder	324	57.71	1,193	12,374	8,588
Davis	4	1.50	31		
Garfield	7	9.00	186	1	1
Iron	6			7	5
Juab	407,492	36,224.46	748,826	5,654,551	3,924,258
Millard	140			140	97
Morgan	29			55	38
Piute	641	650.06	13,438	13,980	9,702
Salt Lake	13,154,000	113,349.06	2,343,133	3,689,623	2,560,598
Summit	364,292	5,050.20	104,397	3,657,329	2,538,186
Tooele	75,559	1,756.83	36,317	516,901	358,729
Uintah	1			4	3
Utah	149,245	7,056.66	145,874	3,877,688	2,691,116
Wasatch	270,912	12,045.57	249,004	3,579,323	2,484,050
Washington	18	.19	4	164	114
	14,479,247	177,803.08	3,675,516	21,276,689	14,766,022

Mine production of gold, silver, copper, lead, and zinc in Utah, 1925 and 1926, by counties—Continued

1925—Continued

County	Copper		Lead		Zinc		Total value
	Pounds	Value	Pounds	Value	Pounds	Value	
Beaver	270, 369	$38, 392	5, 024, 565	$437, 137	167, 229	$12, 709	$711, 888
Box Elder	8, 312	1, 180	27, 075	2, 356			13, 317
Davis	258	37					68
Garfield							187
Iron	38	5	3, 343	291			301
Juab	3, 993, 591	567, 090	47, 781, 770	4, 157, 014	1, 647, 642	125, 221	9, 522, 409
Millard			18, 938	1, 648	36, 215	2, 752	4, 497
Morgan			6, 622	576			614
Piute	1, 932	274	47, 831	4, 161			27, 575
Salt Lake	227, 828, 082	32, 351, 588	114, 723, 786	9, 980, 969	26, 355, 731	2, 003. 036	49, 239, 324
Summit	1, 411, 871	200, 486	51, 854, 345	4, 511, 328	5, 375, 717	408, 555	7, 762, 952
Tooele	1, 037, 047	147, 261	13, 288, 081	1, 156, 063	1, 164, 551	88, 506	1, 786, 876
Uintah	743	106					109
Utah	879, 058	124, 826	44, 427, 971	3, 865, 234			6, 827, 050
Wasatch	1, 053, 799	149, 639	29, 458, 072	2, 562, 852	17, 864, 647	1, 357, 713	6, 803, 258
Washington	1, 440	205	7, 425	646			969
	236, 486, 540	33, 581, 089	306, 669, 824	26, 680, 275	52, 611, 732	3, 998, 492	82, 701, 394

1926

County	Ore, old tailings, etc. (short tons)	Gold (lode and placer)		Silver (lode and placer)	
		Fine ounces	Value	Fine ounces	Value
Beaver	38, 511	1, 028. 79	$21, 267	203, 907	$127, 238
Box Elder	239	62. 50	1, 292	6, 683	4, 170
Cache	3			2	1
Garfield		1. 50	31		
Iron	21	11. 85	245	64	40
Juab	407, 974	31, 443. 27	649, 990	5, 088, 183	3, 175, 026
Millard	453			614	383
Morgan	260	. 39	8	805	503
Piute	594	399. 97	8, 268	6, 082	3, 795
Salt Lake	14, 534, 268	120, 779. 07	2, 496, 725	3, 738, 505	2, 332, 827
San Juan		14. 66	303	1	1
Summit	395, 290	4, 047. 29	83, 665	2, 978, 197	1, 858, 395
Tooele	40, 537	2, 478. 83	51, 242	204, 749	127, 763
Utah	139, 655	7, 517. 67	155, 404	3, 488, 169	2, 176, 618
Wasatch	298, 339	14, 977. 19	309, 606	3, 642, 620	2, 272, 995
	15, 856, 144	182, 762. 98	3, 778, 046	19, 358, 581	12, 079, 755

County	Copper		Lead		Zinc		Total value
	Pounds	Value	Pounds	Value	Pounds	Value	
Beaver	259, 767	$36, 367	4, 180, 434	$334, 435	128, 450	$9, 634	$528, 941
Box Elder	16, 550	2, 317	13, 317	1, 065			8, 844
Cache			2, 174	174			175
Garfield							31
Iron	16	2					287
Juab	4, 624, 011	647, 362	50, 008, 509	4, 000, 681	8, 370, 778	627, 808	9, 100, 867
Millard			87, 617	7, 009			7, 392
Morgan			75, 656	6, 053			6, 564
Piute	3, 640	510	55, 528	4, 442			17, 015
Salt Lake	249, 429, 794	34, 920. 171	113, 299, 672	9, 063, 974	51, 167, 288	3, 837, 547	52, 651, 244
San Juan							304
Summit	1, 139, 615	159, 546	38, 943, 342	3, 115, 467	10, 963, 436	822, 258	6, 039, 331
Tooele	179, 780	25, 169	11, 071. 103	885, 688	2, 368, 563	177, 642	1, 267, 504
Utah	671, 643	94, 030	44, 656, 739	3, 572, 539	107, 524	8, 064	6, 006, 655
Wasatch	1, 139, 666	159, 553	32, 875, 934	2, 630, 075	22, 073, 341	1, 655, 501	7, 027, 730
	257, 464, 482	36, 045, 027	295, 270, 025	23, 621, 602	95, 179, 380	7, 138, 454	82, 662, 884

Ore, old tailings, etc., sold or treated, lode mines producing, and average value of ore, etc., in Utah, 1925 and 1926, by counties

County	Ore, old tailings, etc., (short tons)		Lode mines producing		Average value per ton in all metals		Average value per ton in gold and silver	
	1925	1926	1925	1926	1925	1926	1925	1926
Beaver	56,577	38,511	6	11	$12.58	$13.73	$3.95	$3.86
Box Elder	324	239	5	2	41.10	37.00	30.19	22.85
Cache		3		1		58.33		.33
Davis	4		1		17.00		7.75	
Garfield	7		1		26.71		26.71	
Iron	6	21	1	1	50.17	13.67	.83	13.57
Juab	407,492	407,974	30	27	23.37	22.31	11.47	9.38
Millard	140	453	1	3	32.12	16.32	.69	.85
Morgan	29	260	1	1	21.17	25.25	1.31	1.97
Piute	641	594	3	3	43.02	28.64	36.10	20.31
Salt Lake	13,154,000	14,534,268	49	44	[1]3.66	3.56	.37	.33
Summit	364,292	395,290	14	11	21.31	15.28	7.25	4.91
Tooele	75,559	40,537	46	41	23.65	31.27	5.23	4.42
Uintah	1		1		109.00		3.00	
Utah	149,245	139,655	15	16	45.74	43.01	19.01	16.70
Wasatch	270,912	298,339	4	3	25.11	23.56	10.09	8.66
Washington	18		1		53.83		6.56	
	14,479,247	15,856,144	179	164	[1]5.64	5.16	1.27	1.00

[1] Figures revised to exclude value of silver and copper saved from precipitates.

MINING INDUSTRY

The evidence of large sums paid in dividends, together with the fact of record production of both copper and zinc in Utah in 1926, indicate that the mining industry was in a prosperous condition. Metal prices, which influence production to such a large extent, were slightly less than those of 1925. The average prices of silver and copper in 1926 were far less than the average for the decade 1917 to 1926, which included the war period and the period of purchases by the mint at fixed prices for silver under terms of the Pittman Act. The prices of both lead and zinc in 1926 exceeded the average for the decade.

Labor conditions were satisfactory, and there was much prospecting and development work done. Concrete results were shown in the development of new ore at old mines and the opening of new deposits, such as the North Lily mine. Greatly increased production of silver and lead was made by the Park Utah, Plutus, Mammoth, Utah-Delaware, and Ontario Silver companies. In zinc, the Utah-Apex, Chief Consolidated, Silver King Coalition, United States Smelting, Refining & Mining, Utah-Delaware, and Park Utah companies made great strides.

The output of ore, old tailings, etc., increased nearly 10 per cent in 1926, chiefly from the Bingham district but partly from the Park City region of Summit and Wasatch Counties. Of the various kinds of ore mined in Utah in 1926 copper ore led in quantity, followed by lead-zinc ore and lead ore. There was a marked increase in the output of lead-zinc ore and a corresponding decrease in lead ore.

The total output of Utah included 393,237 tons of old tailings and 649 tons of slag from old smelter dumps. Nearly half the output of old tailings was shipped for smelting and the remainder was reconcentrated. The tables that follow give the output of ore by kinds in the last decade and show the marked increase in the production of copper ore and lead-zinc ore in recent years.

Ore, old tailings, etc., sold or treated in Utah, 1917–1926, with content in terms of recovered metals

DRY AND SILICEOUS ORE

Year	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
1917	164, 057	20, 394. 61	2, 340, 537	2, 579, 070	976, 227	----------
1918	227, 356	22, 815. 44	3, 987, 068	3, 189, 201	1, 214, 547	----------
1919	239, 688	25, 216. 63	3, 645, 909	2, 758, 479	1, 438, 014	----------
1920	291, 020	33, 347. 99	3, 955, 771	2, 116, 803	6, 282, 276	----------
1921	376, 472	29, 554. 10	6, 088, 635	1, 371, 654	8, 735, 063	----------
1922	414, 339	38, 353. 62	8, 110, 733	2, 635, 080	8, 693, 250	----------
1923	346, 425	32, 714. 51	6, 737, 300	2, 852, 586	6, 358, 703	----------
1924	282, 226	27, 098. 75	4, 749, 144	1, 998, 016	7, 137, 005	----------
1925	389, 030	34, 269. 82	4, 434, 524	3, 926, 172	10, 134, 106	----------
1926	301, 213	24, 097. 08	3, 365, 644	2, 970, 610	6, 408, 867	----------
COPPER ORE						
1917	14, 121, 671	94, 844. 85	2, 225, 119	[1] 235, 899, 850	14, 872	----------
1918	13, 512, 274	75, 960. 07	1, 445, 559	[1] 217, 252, 784	2, 557	----------
1919	5, 884, 118	38, 873. 71	586, 417	[1] 116, 312, 084	1, 231	----------
1920	5, 778, 373	31, 845. 51	452, 915	[1] 108, 645, 375	31, 461	----------
1921	1, 357, 857	14, 384. 74	229, 556	[1] 27, 321, 481	255, 567	----------
1922	4, 509, 384	36, 398. 64	473, 284	[1] 91, 088, 007	252, 970	----------
1923	11, 519, 727	84, 203. 12	867, 618	[1] 214, 305, 888	30, 852	----------
1924	12, 357, 366	83, 444. 56	887, 541	[1] 234, 954, 343	199, 275	----------
1925	12, 575, 265	87, 168. 24	959, 790	[1] 223, 484, 426	701, 063	----------
1926	13, 949, 866	100, 853. 65	1, 281, 767	[1] 245, 328, 789	582, 261	----------
LEAD ORE						
1917	638, 071	27, 115. 49	7, 490, 650	6, 256, 268	137, 245, 961	----------
1918	527, 759	20, 225. 49	6, 672, 725	4, 843, 721	113, 517, 267	----------
1919	435, 541	17, 555. 14	6, 664, 219	4, 157, 256	95, 881, 706	----------
1920	559, 896	18, 185. 95	7, 895, 007	4, 961, 482	111, 133, 846	----------
1921	401, 429	41, 628. 44	5, 893, 497	2, 088, 255	79, 519, 436	69, 390
1922	507, 450	17, 853. 25	8, 183, 741	2, 945, 328	107, 416, 311	----------
1923	645, 991	21, 365. 84	10, 648, 952	4, 494, 047	168, 875, 684	16, 535
1924	729, 219	24, 380. 08	9, 936, 956	4, 138, 013	179, 798, 884	403, 789
1925	699, 361	27, 002. 58	10, 318, 309	5, 874, 744	185, 821, 166	----------
1926	383, 857	19, 095. 25	7, 307, 599	4, 038, 262	130, 674, 816	----------
COPPER-LEAD ORE						
1917	6, 443	92. 25	93, 296	393, 079	1, 436, 782	----------
1918	7, 495	118. 96	106, 377	219, 476	1, 125, 021	----------
1919	1, 924	32. 56	38, 936	125, 645	746, 640	----------
1920	6, 389	223. 78	172, 401	407, 397	2, 155, 329	----------
1921	1, 764	31. 84	40, 309	110, 013	677, 203	----------
1922	1, 272	35. 14	20, 919	125, 233	137, 399	----------
1923	971	24. 96	30, 924	90, 624	164, 495	----------
1924	19	1. 76	462	5, 257	3, 294	----------
1925	13	. 04	55	1, 370	1, 924	----------
1926	----------	----------	----------	----------	----------	----------
ZINC ORE AND LEAD-ZINC ORE [2]						
1917	428, 239	19, 853. 05	1, 329, 531	1, 545, 886	38, 848, 116	21, 286, 871
1918	430, 834	23, 479. 96	1, 243, 853	1, 664, 448	51, 148, 832	18, 399, 417
1919	184, 152	22, 786. 37	714, 480	708, 343	25, 761, 460	4, 431, 024
1920	164, 502	13, 829. 01	630, 875	800, 181	21, 235, 201	8, 157, 739
1921	----------	----------	----------	----------	----------	----------
1922	127, 589	18, 366. 67	482, 417	400, 202	18, 832, 214	5, 119, 410
1923	239, 884	10, 490. 94	852, 673	650, 427	28, 018, 059	11, 314, 378
1924	271, 788	11, 550. 48	1, 679, 588	1, 042, 536	46, 772, 417	18, 158, 383
1925 [2]	815, 578	29, 362. 40	5, 564, 011	3, 199, 828	110, 011, 565	52, 611, 732
1926	1, 221, 208	38, 700. 84	7, 403, 570	5, 126, 821	157, 604, 081	95, 179, 380

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[1] Includes copper saved from precipitates.

[2] Includes copper-lead-zinc ore in 1925 as follows: 563 tons, yielding 5.07 ounces of gold, 3,957 ounces of silver, 10,194 pounds of copper, 136,737 pounds of lead, and 212,159 pounds of zinc.

Ore, old tailings, etc., sold or treated in Utah, 1925 and 1926, with content in terms of recovered metals

1925

Source	Mines producing	Ore, old tailings, etc.		Gold		Silver	
		Short tons	Per cent	Fine ounces	Per cent	Fine ounces	Per cent
Dry gold ore	8	8, 087	0. 06	2, 411. 08	1. 36	21, 895	0. 10
Dry gold and silver ore	7	[1] 119, 337	. 82	22, 081. 90	12. 42	636, 383	2. 99
Dry silver ore	37	[2] 261, 606	1. 81	9, 776. 84	5. 50	3, 776, 246	17. 75
Copper ore	25	[3] 12, 575, 265	86. 85	87, 168. 24	49. 02	[4] 959, 790	4. 51
Lead ore	133	[5] 699, 361	4. 83	27, 002. 58	15. 19	10, 318, 309	48. 50
Zinc ore	3	324					
Copper-lead ore	1	13		. 04		55	
Copper-lead-zinc ore	1	563		5. 07		3, 957	. 02
Lead-zinc ore	29	[6] 814, 691	5. 63	29, 357. 33	16. 51	5, 560, 054	26. 13
	[7] 179	14, 479, 247	100. 00	177, 803. 08	100. 00	21, 276, 689	100. 00

Source	Copper		Lead		Zinc	
	Pounds	Per cent	Pounds	Per cent	Pounds	Per cent
Dry gold ore	51, 621	0. 02	19, 819			
Dry gold and silver ore	2, 520, 393	1. 07	845, 423	0. 28		
Dry silver ore	1, 354, 158	. 57	9, 268, 864	3. 02		
Copper ore	[8] 223, 484, 426	94. 50	701, 063	. 23		
Lead ore	5, 874, 744	2. 49	185, 821, 166	60. 60		
Zinc ore			18, 400		141, 452	0. 27
Copper-lead ore	1, 370		1, 924			
Copper-lead-zinc ore	10, 194		136, 737	. 05	212, 159	. 40
Lead-zinc ore	3, 189, 634	1. 35	109, 856, 428	35. 82	52, 258, 121	99. 33
	236, 486, 540	100. 00	306, 669, 824	100. 00	52, 611, 732	100. 00

1926

Source	Mines producing	Ore, old tailings, etc.		Gold		Silver	
		Short tons	Per cent	Fine ounces	Per cent	Fine ounces	Per cent
Dry gold ore	7	344		1, 297. 40	0. 70	643	
Dry gold and silver ore	6	[9] 113, 476	0. 71	14, 165. 75	7. 75	460, 672	2. 38
Dry silver ore	31	[10] 187, 393	1. 18	8, 633. 93	4. 74	2, 904, 329	15. 00
Copper ore	26	13, 949, 866	87. 98	100, 853. 65	55. 18	1, 281, 767	6. 62
Lead ore	121	[11] 383, 857	2. 42	19, 095. 25	10. 45	7, 307, 599	37. 75
Zinc ore	3	[12] 2, 573	. 02	1. 98		732	. 01
Lead-zinc ore	40	[13] 1, 218, 635	7. 69	38, 698. 86	21. 17	7, 402, 838	38. 24
Total, lode mines	[7] 164	15, 856, 144	100. 00	182, 746. 82	99. 99	19, 358, 580	100. 00
Total, placers	2			16. 16	. 01	1	
	166	15, 856, 144	100. 00	182, 762. 98	100. 00	19, 358, 581	100. 00

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[1] Includes 75,619 tons of old tailings sold to a smelter.

[2] Includes 102,546 tons of old tailings and 476 tons of slag sold to a smelter and 54,378 tons of ore leached.

[3] Includes 4 tons of matte sold to a smelter.

[4] Includes 12 ounces of silver saved from precipitates.

[5] Includes 115,701 tons of old tailings concentrated and 18,140 tons of old tailings and 81 tons of slag sold to a smelter.

[6] Includes 18,000 tons of old tailings reconcentrated.

[7] A mine producing more than one class of ore is counted but once in arriving at total for all classes.

[8] Includes 7,359,866 pounds of copper saved from precipitates.

[9] Includes 112,078 tons of old tailings sold to a smelter.

[10] Includes 58,400 tons of old tailings sold to a smelter.

[11] Includes 12,159 tons of old tailings and 649 tons of slag sold to a smelter.

[12] Includes 2,500 tons of old tailings reconcentrated.

[13] Includes 208,100 tons of old tailings reconcentrated.

Ore, old tailings, etc., sold or treated in Utah, 1925 and 1926, with content in terms of recovered metals—Continued

1926—Continued

Source	Copper		Lead		Zinc	
	Pounds	Per cent	Pounds	Per cent	Pounds	Per cent
Dry gold ore	1, 194					
Dry gold and silver ore	1, 353, 154	0. 52	434, 221	0. 15		
Dry silver ore	1, 616, 262	. 63	5, 974, 646	2. 02		
Copper ore	[14] 245, 328, 789	95. 29	582, 261	. 20		
Lead ore	4, 038, 262	1. 57	130, 674, 816	44. 26		
Zinc ore	1, 200		6, 350		158, 333	0. 17
Lead-zinc ore	5, 125, 621	1. 99	157, 597, 731	53. 37	95, 021, 047	99. 83
	257, 464, 482	100. 00	295, 270, 025	100. 00	95, 179, 380	100. 00

[14] Includes 6,187,049 pounds of copper saved from precipitates.

Value of metals from ore, old tailings, etc., sold or treated in Utah in 1926, by kinds of ore

Kind of ore	Ore, old tailings, etc. (short tons)	Gold	Silver	Copper	Lead	Zinc	Total
Dry gold ore	344	$26, 820	$401	$167			$27, 388
Dry gold and silver ore	113, 476	292, 832	287, 459	189, 441	$34, 738		804, 470
Dry silver ore	187, 393	178, 479	1, 812, 301	226, 277	477, 972		2, 695, 029
Copper ore	13, 949, 866	2, 084, 830	799, 823	[1] 34, 346, 030	46, 581		37, 277, 264
Lead ore	383, 857	394, 734	4, 559, 942	565, 357	10, 453, 985		15, 974, 018
Zinc ore	2, 573	41	457	168	508	$11, 875	13, 049
Lead-zinc ore	1, 218, 635	799, 976	4, 619, 371	717, 587	12, 607, 818	7, 126, 579	25, 871, 331
	15, 856, 144	3, 777, 712	12, 079, 754	[1] 36, 045, 027	23, 621, 602	7, 138, 454	82, 662, 549
Total, 1925	14, 479, 247	3, 675, 516	[2] 14, 766, 022	[2] 33, 581, 089	26, 680, 275	3, 998, 492	82, 701, 394

[1] Includes value of 6,187,049 pounds of copper saved from precipitates.
[2] Includes value of 12 ounces of silver and 7,359,866 pounds of copper saved from precipitates.

GOLD ORE

The metals recovered from gold ore were valued at $27,388, an average of $79.62 a ton. The ore yielded on the average 3.771 ounces of gold and 1.87 ounces of silver to the ton and 0.17 per cent of copper. Fifty per cent of the gold ore was mined in the Clifton district, Tooele County.

GOLD AND SILVER ORE

Six mines in 1926, compared with seven in 1925, produced siliceous gold and silver ore and old tailings which yielded on the average 0.124 ounce of gold and 4.06 ounces of silver to the ton, 0.6 per cent of copper, and 0.19 per cent of lead. The Tintic district in Juab County produced 99 per cent of this gold and silver material, and most of it was old tailings shipped from the Mammoth dump for smelting.

SILVER ORE

Dry and siliceous silver ore and old tailings were produced by 31 mines in 1926, against 37 in 1925, and yielded on the average $0.95 in gold, 15.5 ounces of silver, 8.62 pounds of copper, and 31.88 pounds of lead to the ton. Sixteen mines in the Tintic district in

Juab and Utah Counties produced 117,326 tons of silver ore and old tailings. The largest producers of this material were the Tintic Standard mine at Dividend, the Park Utah mine at Keetley near Park City, the Horn Silver property at Frisco, and the Bullion Beck & Champion and the Mammoth mines in the Tintic district.

COPPER ORE

Copper ore represented 88 per cent of the total output of the State; it yielded on the average 0.007 ounce of gold, 0.09 ounce of silver, and 17.14 pounds of copper to the ton, and the average value in metals per ton was $2.61. Salt Lake County was credited with more than 99 per cent of the output, chiefly from the Utah Copper property at Bingham. Other leading producers of copper ore were the Chief Consolidated mines (Grand Central) in the Tintic district and the Utah-Delaware and Utah-Apex properties at Bingham.

LEAD ORE

The metals recovered from lead ore, old tailings, and slag in 1926 were valued at $15,974,018, an average of $41.61 to the ton. The output of ore, etc., was from 121 mines and averaged 0.049 ounce of gold and 19.04 ounces of silver to the ton, 0.53 per cent of copper, and 17.02 per cent of lead. More than 60 per cent of this material was produced from Juab and Salt Lake Counties. There were unusually large decreases in the output of lead ore from the Chief Consolidated, Utah-Apex, and Silver King Coalition properties, but good increases from the Plutus, Tintic Standard, and Mammoth mines. In 1925 there were 133 mines producing lead ore, etc., with a value in metals of $24,719,755.

The largest producer of lead ore in Utah in 1926 was the Tintic Standard mine at Dividend in the Tintic district. It was followed in order by the Utah-Apex mine at Bingham; the Plutus, Chief Consolidated, and Eagle & Blue Bell mines in the Tintic district; the Bingham Mines at Bingham; the Silver King Coalition mine at Park City; the Utah-Delaware mine at Bingham; and the Mammoth mine in the Tintic district.

ZINC ORE

The output of zinc ore and old tailings in 1926 came from three mines and yielded on the average $5.07 in metals a ton; most of it was old tailings from the Park City region.

LEAD-ZINC ORE

Nearly all the zinc produced by Utah mines in 1926 was recovered from lead-zinc ore and old tailings. The output of this material increased 50 per cent over 1925 and yielded on the average 0.03 ounce of gold and 6.07 ounces of silver to the ton, 0.21 per cent of copper, 6.47 per cent of lead, and 3.90 per cent of zinc. About 41 per cent of it came from the Bingham or West Mountain district and 51 per cent from the Park City region, and nearly half the output from these districts was concentrated at Midvale and International, where an increased quantity of custom ore was treated. Most of the zinc product from lead-zinc ore was shipped to the electrolytic zinc plant at Great Falls, Mont., but a large part of it went to Amarillo, Tex., and Bartlesville, Okla., and a little was shipped to Colorado and Kansas.

The largest producers of lead-zinc ore in Utah in 1926 were the Park Utah Consolidated mines in the Park City region; the property of the United States Smelting, Refining & Mining Co., the Utah-Apex, and the Utah-Delaware mines at Bingham; the Silver King Coalition mine at Park City; and the Chief Consolidated mines, in the Tintic district. There was also a large quantity of old tailing from Park City reconcentrated, but the recoveries were comparatively small.

Ore, old tailings, etc., sold or treated in Utah, 1925 and 1926, by counties, with content in terms of recovered metals

1925

DRY GOLD ORE

County	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Box Elder	12	8.97	4			
Garfield	7	9.00	1			
Juab	7,815	1,559.10	21,202	48,660	19,808	
Piute	1	.77				
Salt Lake	167	164.94	612	2,961	11	
Tooele	85	668.30	76			
	8,087	2,411.08	21,895	51,621	19,819	

DRY GOLD AND SILVER ORE

County	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
Beaver	102	16.08	712	407		
Juab	[1] 117,828	21,296.94	616,438	2,485,482	809,488	
Piute	522	637.61	13,146	1,728	35,935	
Salt Lake	885	131.27	6,087	32,776		
	119,337	22,081.90	636,383	2,520,393	845,423	

DRY SILVER ORE

County	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
Beaver	[2] 50,930	1,401.66	239,077	232,065	3,254,147	
Box Elder	171	46.83	11,463	696	3,394	
Juab	[3] 89,848	4,502.27	1,218,098	600,332	2,084,032	
Salt Lake	[4] 6,116	616.91	65,369	20,357	104,372	
Summit	[5] 13,457	399.73	85,222	95,954	718,498	
Tooele	[6] 1,563	5.93	5,884	34,255	13,249	
Utah	[7] 65,486	557.45	1,389,961	300,067	2,714,184	
Wasatch	34,035	2,246.06	761,172	70,432	376,988	
	261,606	9,776.84	3,776,246	1,354,158	9,268,864	

COPPER ORE

County	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
Box Elder	61		12	7,367		
Davis	4	1.52		258		
Juab	1,030	166.90	12,969	141,779	9,308	
Salt Lake	[8] 12,571,158	83,794.91	[9] 928,749	[9] 223,090,468	688,350	
Tooele	153	2.70	3,370	11,836	3,405	
Uintah	1		4	743		
Utah	2,857	3,202.21	14,686	231,092		
Washington	1			883		
	12,575,265	87,168.24	959,790	223,484,426	701,063	

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[1] Includes 75,619 tons of old tailings sold to a smelter.

[2] Consists of 50,545 tons of old tailings and 385 tons of slag sold to a smelter.

[3] Includes 38,544 tons of old tailings sold to a smelter.

[4] Includes 1 ton of slag sold to a smelter.

[5] Consists of old tailings sold to a smelter.

[6] Includes 32 tons of slag sold to a smelter.

[7] Includes 58 tons of slag sold to a smelter and 54,378 tons of ore leached.

[8] Includes 4 tons of matte sold to a smelter.

[9] Includes 12 ounces of silver and 7,359,866 pounds of copper saved from precipitates.

Ore, old tailings, etc., sold or treated in Utah, 1925 and 1926, by counties, with content in terms of recovered metals—Continued

1925—Continued

LEAD ORE

County	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Beaver	5,090	177.90	31,087	36,777	1,664,568	
Box Elder	80	1.92	895	249	23,681	
Iron	6		7	38	3,343	
Juab	[10] 181,361	8,474.14	3,717,973	707,362	43,266,493	
Millard	73		140		18,938	
Morgan	29		55		6,622	
Piute	118	11.67	834	204	11,896	
Salt Lake	[11] 184,742	11,150.42	1,318,632	2,849,961	52,933,008	
Summit	[12] 172,245	2,611.72	2,078,719	865,135	31,296,218	
Tooele	[13] 67,017	1,003.10	486,775	960,098	12,408,959	
Utah	80,902	3,296.99	2,473,041	347,899	41,713,787	
Wasatch	7,681	274.55	209,987	106,464	2,466,228	
Washington	17	.17	164	557	7,425	
	699,361	27,002.58	10,318,309	5,874,744	185,821,166	

LEAD-ZINC ORE

Beaver	455	6.22	3,673	1,120	105,850	167,229
Juab	9,391	225.09	67,871	9,976	1,574,241	1,561,436
Salt Lake	390,932	17,490.61	1,370,174	1,831,559	60,998,045	26,355,731
Summit	[14] 178,590	2,038.75	1,493,388	450,782	19,839,629	5,375,717
Tooele	6,127	71.69	16,784	19,294	723,807	933,361
Wasatch	229,196	9,524.97	2,608,164	876,903	26,614,856	17,864,647
	814,691	29,357.33	5,560,054	3,189,634	109,856,428	52,258,121

1926

DRY GOLD ORE

Iron	21	11.86	64	16		
Piute	56	137.57	304	73		
Salt Lake	94	63.37	193	1,105		
Tooele	173	1,084.60	82			
	344	1,297.40	643	1,194		

DRY GOLD AND SILVER ORE

Juab	[15] 112,307	13,775.59	455,276	1,338,714	427,133	
Salt Lake	887	311.85	2,120	13,914	6,679	
Tooele	11	11.51	257			
Utah	271	66.80	3,019	526	409	
	113,476	14,165.75	460,672	1,353,154	434,221	

DRY SILVER ORE

Beaver	[16] 32,282	836.08	139,628	208,288	1,762,171	
Box Elder	134	62.52	6,683	1,048	13,317	
Juab	[17] 67,279	3,632.65	1,054,045	1,019,350	1,449,601	
Salt Lake	407	46.16	5,074	1,694	3,596	
Summit	[18] 2,918	107.87	47,062	24,495	44,535	
Tooele	173	6.98	1,403	2,252	11,607	
Utah	[19] 50,064	2,244.27	907,073	274,737	2,242,279	
Wasatch	34,136	1,697.40	743,361	84,398	447,540	
	187,393	8,633.93	2,904,329	1,616,262	5,974,646	

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[10] Includes 17,030 tons of old tailings sold to a smelter.
[11] Includes 81 tons of slag sold to a smelter.
[12] Includes 108,850 tons of old tailings concentrated and 1,110 tons of old tailings sold to a smelter.
[13] Includes 6,851 tons of old tailings concentrated.
[14] Includes 18,000 tons of old tailings reconcentrated.
[15] Includes 112,078 tons of old tailings sold to a smelter.
[16] Includes 31,890 tons of old tailings sold to a smelter.
[17] Includes 23,946 tons of old tailings sold to a smelter.
[18] Includes 2,465 tons of old tailings sold to a smelter.
[19] Includes 99 tons of old tailings sold to a smelter.

Ore, old tailings, etc., sold or treated in Utah, 1925 and 1926, by counties, with content in terms of recovered metals—Continued

1926—Continued

COPPER ORE

County	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Box Elder	105			15, 502		
Juab	25, 565	6, 794. 94	235, 846	1, 446, 890	108, 378	
Piute	32	38. 03	592	2, 271		
Salt Lake	13, 922, 973	92, 649. 23	1, 040, 659	[20]243,792,839	468, 392	
Tooele	25	. 20	89	5, 315		
Utah	1, 166	1, 371. 25	4, 581	65, 972	5, 491	
	13, 949, 866	100, 853. 65	1, 281, 767	245, 328, 789	582, 261	

LEAD ORE

County	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
Beaver	[21] 5, 840	184. 74	61, 410	50, 393	2, 327, 346	
Cache	3		2		2, 174	
Juab	[22] 124, 363	5, 540. 59	2, 608, 115	729, 507	32, 921, 679	
Millard	453		614		87, 617	
Morgan	260	. 40	805		75, 656	
Piute	506	224. 39	5, 186	1, 296	55, 528	
Salt Lake	[23] 108, 209	6, 789. 26	931, 074	2, 358, 611	30, 486, 099	
Summit	25, 807	1, 109. 79	780, 437	352, 837	11, 855, 346	
Tooele	24, 354	1, 182. 64	155, 369	130, 310	8, 801, 555	
Utah	[24] 87, 850	3, 830. 08	2, 570, 583	328, 948	42, 372, 385	
Wasatch	6, 212	233. 36	194, 004	86, 360	1, 689, 431	
	383, 857	19, 095. 25	7, 307, 599	4, 038, 262	130, 674, 816	

LEAD-ZINC ORE

County	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
Beaver	389	7. 98	2, 869	1, 086	90, 917	128, 450
Juab	78, 434	1, 699. 52	734, 889	89, 550	15, 101, 128	8, 366, 109
Salt Lake	[25] 501, 698	20, 919. 20	1, 759, 385	3, 261, 631	82, 334, 906	51, 167, 288
Summit	[26] 364, 065	2, 827. 62	2, 149, 978	761, 083	27, 037, 701	10, 844, 096
Tooele	15, 801	192. 88	47, 549	41, 903	2, 257, 941	2, 368, 563
Utah	257	5. 25	2, 913	1, 460	36, 175	73, 200
Wasatch	257, 991	13, 046. 41	2, 705, 255	968, 908	30, 738, 963	22, 073, 341
	1, 218, 635	38, 698. 86	7, 402, 838	5, 125, 621	157, 597, 731	95, 021, 047

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[20] Includes 6,187,049 pounds of copper saved from precipitates.
[21] Includes 358 tons of slag sold to a smelter.
[22] Includes 12,159 tons of old tailings sold to a smelter.
[23] Includes 288 tons of slag sold to a smelter.
[24] Includes 3 tons of slag sold to a smelter.
[25] Includes 1,600 tons of old tailings reconcentrated.
[26] Includes 206,500 tons of old tailings reconcentrated.

The following table gives the kind and grade of zinc material marketed in 1925 and 1926:

Zinc ore, lead-zinc ore, and concentrates (as marketed from Utah mines and mills) sold to smelters, 1925 and 1926

Classification	County	Quantity (dry weight)	Gross zinc	Average assay of ore or concentrates	Recovered zinc
1925		*Short tons*	*Pounds*	*Per cent*	*Pounds*
Oxidized zinc ore	Juab, Millard, and Tooele.	324	176, 816	27. 29	141, 452
Oxidized lead-zinc ore	Tooele	106	39, 879	18. 81	31, 903
Sulphide lead-zinc ore	Juab	94	41, 238	21. 94	32, 990
Zinc and lead-zinc concentrates	Beaver, Juab, Salt Lake, Summit, Tooele, and Wasatch.	62, 553	61, 528, 197	49. 18	52, 193, 228
		63, 077	61, 786, 130	48. 98	52, 399, 573
1926					
Oxidized zinc ore	Utah	47	40, 381	42. 96	34, 324
Oxidized lead-zinc ore	Tooele and Utah	124	54, 768	22. 08	42, 719
Sulphide lead-zinc ore	Salt Lake and Tooele	192	101, 221	26. 36	78, 952
Zinc concentrates	Beaver, Juab, Salt Lake, Summit, Tooele, and Utah.	108, 705	109, 752, 288	50. 48	95, 023, 385
		109, 068	109, 948, 658	50. 40	95, 179, 380

METALLURGIC INDUSTRY

In 1926 nearly all of the ore from Utah mines was milled, and the resulting concentrates, with the first-class shipping ore, and old tailings, precipitates, etc., were smelted and yielded metals valued at $80,328,566, or 97 per cent of the total output of the State. In fact, Utah has developed into a smelting center of great importance, as it has large custom copper plants at Garfield and International and lead plants at Midvale, Murray, and International; these plants are discussed under Salt Lake and Tooele Counties.

Milling has made great strides in recent years, especially in the adoption of flotation at most of the large plants. The development of the practice at the Utah Copper Co.'s plants and the custom mills at International, Midvale, and Bauer has been notable. Progress has been made also at local plants by the Chief Consolidated, Utah-Apex, and Silver King Coalition companies.

In Utah 18 milling plants were running in 1926. Three of these plants used tables followed by flotation devices, 8 used ordinary table concentration, and 7 used straight flotation; 1 of the flotation mills was also equipped with a volatilization plant. At 8 properties copper was precipitated from mine water or from ore leached in place, and most of this copper was recovered at the plant of the Ohio Copper Co. at Bingham, where regular leaching work is done. No ore was treated in amalgamation or cyanidation mills in 1926.

A list of the active and idle milling plants in Utah in 1925, prepared by the Bureau of Mines, may be had upon request. This list gives the process and equipment of each mill designed to treat ore in Utah.

Flotation, which has made such interesting strides in Utah, is well described in the Quarterly [2] of the School of Mines at Golden, Colo. This publication discusses the theory of flotation, reagents used, general operations, equipment, testing, and practice, and gives a comprehensive bibliography. The ever-changing practice at International and Midvale is briefly given. An article [3] describing practice at the mills of the Utah Copper Co., especially the change to an alkaline circuit and the improvement in the grade of concentrate by dropping pyrite, was published in January, 1927.

Concentrates produced in Utah in 1926 yielded 68 per cent of the gold, 43 per cent of the silver, 93 per cent of the copper, 54 per cent of the lead, and more than 99 per cent of the zinc. Large increases were shown in copper concentrates and zinc concentrates, but there was a decrease in lead concentrates. The dry and siliceous concentrates included a large quantity of iron concentrates, containing gold and silver with a little copper and lead, made at custom flotation plants treating galena-sphalerite-pyrite ores.

Ore of all kinds shipped to the smelters amounted to 4 per cent of the total output and yielded 23 per cent of the gold, 53 per cent of the silver, 4 per cent of the copper, 45 per cent of the lead, and less than one-half of 1 per cent of the zinc. A good increase was recorded in the shipment of first-class copper ore, but a decided decrease is apparent in the shipment of lead ore and siliceous ore.

The miscellaneous material, other than ore and old tailings concentrated and crude ore smelted, consisted of 183,286 tons of slag and old tailings shipped for smelting and of copper precipitates from mine water and from leaching of ore in place. This miscellaneous material yielded 15,621.12 ounces of gold, 880,419 ounces of silver, 7,900,267 pounds of copper, and 4,445,597 pounds of lead, valued in all at $2,333,984; most of the gold, silver, and lead in this material came from the Tintic district in Juab County, whereas most of the copper came from the Bingham or West Mountain district in Salt Lake County. Much of the miscellaneous material came also from the San Francisco district in Beaver County and from the Park City region in Summit County.

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[2] Weinig, Arthur J., and Palmer, Irving A., "The trend of flotation": Colorado Sch. Mines Quarterly, vol. 21, No. 2, April, 1926.

[3] Howard, L. O., "Selective flotation and its relation to metallurgy": The Black Hills Engineer, January, 1927, p. 14.

Mine production of metals from Utah concentrates in 1926

BY COUNTIES

	Ore and old tailings to concentrating mills		Concentrates and recovered metal						
	Ore	Old tailings	Concentrates produced	Gold	Silver	Copper	Lead	Zinc	Total value of metal
	Short tons	*Short tons*	*Short tons*	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*	
Beaver	389	-------	301	7. 98	2, 869	1, 086	90, 917	128, 450	$19, 014
Juab	78, 511	-------	30, 749	1, 699. 96	736, 209	89, 568	15, 114, 263	8, 370, 778	2, 344, 024
Piute	282	-------	47	8. 47	971	546	18, 580	----------	2, 344
Salt Lake	14, 381, 180	1, 600	905, 224	106, 972. 74	2, 617, 735	236, 744, 749	82, 502, 475	51, 114, 395	47, 422, 832
Summit	157, 565	209, 000	44, 050	2, 829. 62	2, 150, 698	762, 283	27, 043, 461	10, 963, 436	4, 492, 985
Tooele	16, 179	-------	5, 519	192. 88	48, 105	41, 903	2, 328, 254	2, 334, 105	401, 189
Utah	2, 157	-------	304	6. 05	10, 619	3, 420	282, 772	38, 880	32, 768
Wasatch	257, 991	-------	71, 820	13, 046. 41	2, 705, 255	968, 908	30, 738, 963	22, 073, 341	6, 208, 037
	14, 894, 254	210, 600	1, 058, 014	124, 764. 11	8, 272, 461	238, 612, 463	158, 119, 685	95, 023, 385	60, 923, 193
Total, 1925	13, 414, 572	133, 701	893, 815	108, 966. 84	7, 265, 841	217, 536, 046	123, 771, 918	52, 405, 387	52, 936, 124

BY KINDS OF CONCENTRATES

Dry and siliceous	61, 160	8, 153. 64	325, 736	279, 162	2, 457, 377	----------	$607, 483
Copper	715, 724	86, 078. 92	852, 976	233, 765, 620	----------	----------	35, 038, 853
Lead	172, 425	25, 440. 94	6, 330, 921	3, 796, 730	148, 947, 880	----------	16, 923, 779
Zinc	108, 705	5, 090. 61	762, 828	770, 951	6, 714, 428	95, 023, 385	8, 353, 078

AVERAGE RECOVERABLE CONTENT

	Short tons	*Fine ounces per ton*	*Fine ounces per ton*	*Per cent*	*Per cent*	*Per cent*	*Value per ton*
Dry and siliceous	61, 160	0. 133	5. 33	0. 23	2. 01	----------	$9. 93
Copper	715, 724	. 120	1. 19	16. 33	----------	----------	48. 96
Lead	172, 425	. 148	36. 72	1. 10	43. 19	----------	98. 15
Zinc	108, 705	. 047	7. 02	. 35	3. 09	43. 71	76. 84
	1, 058, 014	. 118	7. 82	11. 28	7. 47	4. 49	57. 58
Total, 1925	893, 815	. 121	8. 13	12. 17	6. 92	2. 93	59. 22

Mine production of metals from Utah crude ore shipped to smelters in 1926

BY COUNTIES

	Ore	Gold	Silver	Copper	Lead	Zinc	Total value of metal
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*	
Beaver	5, 874	232. 35	63, 869	57, 335	2, 291, 529		$236, 006
Box Elder	239	62. 52	6, 683	16, 550	13, 317		8, 844
Cache	3		2		2, 174		175
Iron	21	11. 86	64	16			287
Juab	181, 280	15, 061. 26	3, 628, 368	3, 045, 061	32, 364, 498		5, 590, 914
Millard	453		614		87, 617		7, 392
Morgan	260	. 40	805		75, 656		6, 564
Piute	312	391. 52	5, 111	3, 094	36, 948		14, 672
Salt Lake	151, 200	13, 753. 52	1, 118, 520	6, 493, 463	30, 727, 619	52, 893	4, 353, 528
Summit	26, 260	1, 127. 11	810, 497	359, 549	11, 855, 346		1, 527, 815
Tooele	24, 358	2, 285. 93	156, 644	137, 877	8, 742, 849	34, 458	866, 316
Utah	137, 396	7, 504. 36	3, 477, 158	668, 049	44, 370, 219	68, 644	5, 973, 168
Wasatch	40, 348	1, 930. 76	937, 365	170, 758	2, 136, 971		819, 692
	568, 004	42, 361. 59	10, 205, 700	10, 951, 752	132, 704, 743	155, 995	19, 405, 373
Total, 1925	679, 710	57, 333. 14	12, 004, 986	9, 944, 242	172, 684, 968	206, 345	25, 967, 997

BY KINDS OF ORE

Dry and siliceous	130, 735	8, 768. 15	2, 567, 496	1, 317, 301	3, 427, 617		$2, 242, 003
Copper	69, 766	14, 825. 61	436, 311	5, 676, 447	582, 261		1, 420, 015
Lead	367, 140	18, 767. 83	7, 201, 893	3, 958, 004	128, 641, 613		15, 727, 395
Zinc	47					34, 324	2, 574
Lead-zinc	316				53, 252	121, 671	13, 386

AVERAGE RECOVERABLE CONTENT

	Short tons	*Fine ounces per ton*	*Fine ounces per ton*	*Per cent*	*Per cent*	*Per cent*	*Value per ton*
Dry and siliceous	130, 735	0. 067	19. 64	0. 50	1. 31		$17. 15
Copper:							
Oxidized	2, 814	. 321	18. 92	3. 43	. 07		28. 10
Sulphide	66, 952	. 208	5. 72	4. 10	. 43		20. 03
Lead:							
Oxidized	106, 623	. 049	17. 23	. 27	14. 77		36. 15
Sulphide	260, 517	. 052	20. 59	. 65	18. 65		45. 58
Zinc: Oxidized	47					36. 51	54. 77
Lead-zinc:							
Oxidized	124				4. 35	17. 23	32. 80
Sulphide	192				11. 06	20. 56	48. 54
	568, 004	. 075	17. 97	. 96	11. 68	. 01	34. 16
Total, 1925	679, 710	. 084	17. 66	. 73	12. 70	. 01	38. 20

REVIEW BY COUNTIES AND DISTRICTS

BEAVER COUNTY

In 1926 11 lode mines in Beaver County produced 38,511 tons of ore, old tailings, and slag, yielding metals valued at $528,941, a decrease from $711,888 in 1925. Mines of the Star district near Milford continued to produce lead ore, and the Horn Silver property at Frisco was a large contributor despite the reports of its exhaustion.

Lincoln district.—Several cars of sulphide lead ore were shipped from the Croff property near Minersville to the smelter at Murray, and some lead-zinc ore was shipped from this property for milling at International; approximately 300 feet of development was done in shafts and tunnels. One lot of lead-zinc ore was shipped from the Lincoln mine to be tested by flotation.

Rocky district.—The Milford Copper Co. of Utah shipped several thousand tons of iron ore to the smelter at Murray. As this material contained practically no gold or silver, and was used merely as a flux at the smelter, the figures are excluded from the statistics in this report and are included in those presented in the Mineral Resources chapter on iron ore.

San Francisco district.—The output of the San Francisco district consisted of first-class ore and mill ore from the Horn Silver mine and a large quantity of old tailings shipped by a lessee from the Horn Silver dump; the metals recovered from the tailings were far in excess of those recovered from the mine ore. The oxidized lead ore, with some siliceous silver ore, and the old tailings were shipped for smelting, and the lead-zinc ore was shipped to International for treatment in the flotation plant. The Horn Silver Mines Co. paid a dividend of $12,000 in 1926, the first since 1918; the total dividends paid to the end of 1918 amounted to $6,992,000.

Star and North Star district.—Six lode mines in the Star district produced 2,963 tons of first-class lead ore that yielded $1,022 in gold, 27,036 ounces of silver, 14,419 pounds of copper, and 1,504,575 pounds of lead, valued in all at $140,277, or $47.34 in metals a ton. The largest output was that of the Moscow Silver Mines Co., which produced more than 2,000 tons of oxidized lead ore. Nearly 600 tons of similar ore were shipped from the Wild Bill property, where 200 feet of drifting was done from a 700-foot inclined shaft. Lead ore was also shipped from the Orphan Boy, Magnolia, Beaver Crown, and Maud S. properties.

BOX ELDER COUNTY

Ashbrook district.—The Skoro Consolidated Mining & Milling Co. shipped from the Apex mine several cars of silver ore containing gold and a little copper, and did about 800 feet of development in prospecting for ore, which contains lead, zinc, iron, and manganese in addition to the precious metals.

Lucin district.—Several cars of sulphide copper ore mined by a lessee were shipped from the Copper Mountain mine to the smelter at Garfield. The property is owned by the Salt Lake Copper Co., a large producer of copper in the past.

CACHE COUNTY

Richmond district.—The Emmett Mining & Milling Co. shipped a small test lot of sulphide lead ore while developing a prospect near Richmond.

GARFIELD COUNTY

Imperial district.—The Emery and Burro placer claims on Crescent Creek near the Henry Mountains were being developed for future operations by hydraulic and sluicing methods. A small quantity of placer gold was recovered in doing assessment work.

IRON COUNTY

Stateline district.—One car of silver-bearing gold ore was shipped from the King Solomon claim northwest of Modena.

JUAB COUNTY

Twenty-seven lode mines in Juab County produced metals valued at $9,100,867 in 1926, a decrease from $9,522,409 in 1925. Most of the ore and old tailings came from mines and dumps near Eureka, mentioned in the review of the Tintic district. The increase in the output of the Plutus and Mammoth mines and Mammoth tailing dump was large, but a marked decrease was recorded from the Chief Consolidated properties.

Fish Springs district.—Three lode mines in the Fish Springs district produced 86 tons of ore that yielded silver and lead valued together at $8,899, or $103.48 in metals a ton. No mines were worked regularly, but small lots of crude ore and concentrate from dump ore were shipped from the Galena, Emma, and Utah properties.

Mount Nebo district.—Several lots of lead ore were shipped from the Starlight and other properties near Mona; a little lead-zinc ore was shipped from the Starlight mine to a custom flotation plant for treatment. The Nebo Syndicate, owning property in Bear Canyon at the foot of Mount Nebo, reported a large quantity of milling ore in reserve, for which a 50-ton flotation plant is planned. One car of lead ore was shipped by the Intermountain Metal Co.

Spring Creek district.—The Boston group, near Ibapah, was operated a short time by the Crawford Exploration Co., and one car of siliceous silver ore was shipped for smelting; the lease was relinquished in August.

Tintic district.—A number of important mines in the eastern part of the Tintic district lie in Utah County, but they are reviewed here, and their output is included in the following tables:

Mine production of gold, silver, copper, lead, and zinc in Tintic district, Utah, 1925–26, and total, 1869–1926

	Mines producing	Ore and old tailings	Gold	Silver	Copper	Lead	Zinc	Total value
1926		*Short tons*		*Fine ounces*	*Pounds*	*Pounds*	*Pounds*	
Juab	19	407,768	$649,968	5,080,422	4,623,798	49,911,928	8,366,109	$9,087,895
Utah	8	136,134	126,886	3,470,426	601,849	44,304,502	34,320	5,923,625
	27	[1] 543,902	776,854	8,550,848	5,225,647	94,216,430	8,400,429	15,011,520
Total, 1925	28	[2] 553,153	828,028	9,499,425	4,626,782	91,778,506	1,647,642	16,187,583
Total, 1869–1926	-------	(3)	37,955,838	197,265,801	204,143,291	1,277,168,094	27,891,231	293,568,129

[1] Includes 148,282 tons of old tailings.

[2] Includes 131,193 tons of old tailings and 54,378 tons of ore leached.

[3] Figures not available.

NOTE.—Total dividends, 1869-1926, $45,649,468.

The value of the metals from the Tintic district in 1926 was as follows: Gold, $776,854, against $828,028 in 1925; silver, $5,335,729, against $6,592,601; copper, $731,591, against $657,003; lead, $7,537,314, against $7,984,730; zinc, $630,032, against $125,221. The ore and old tailings sold or treated in the district in 1926 yielded on an average $27.60 in metals a ton, compared with $29.26 in 1925.

Mine production of gold, silver, copper, lead, and zinc in Tintic district, Utah, in 1926, by kinds of ore

Kind of ore	Mines producing	Ore and old tailings	Gold	Silver	Copper	Lead	Zinc
		Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Dry and siliceous	18	[1] 229,904	19,719.16	2,418,243	2,633,181	4,118,601	----------
Copper	5	25,565	6,794.94	235,846	1,446,890	108,378	----------
Lead	20	[2] 209,899	9,366.69	5,161,870	1,056,026	74,879,923	----------
Lead-zinc	3	78,534	1,699.52	734,889	89,550	15,109,528	8,400,429
	[3] 27	543,902	37,580.31	8,550,848	5,225,647	94,216,430	8,400,429

[1] Includes 136,123 tons of old tailings.

[2] Includes 12,159 tons of old tailings.

[3] A mine producing more than one class of ore is counted but once in arriving at total for all classes.

There was a large decrease in the gold, silver, and copper output from the Chief Consolidated properties—the Chief, Grand Central, and Gemini mines—but the lead output was nearly the same as in 1925 and the zinc output was decidedly increased. The Chief Consolidated flotation plant at Eureka was operated continuously on lead-zinc ore, and nearly 28,000 tons of similar ore was shipped to the custom flotation plant at Midvale. The crude ore shipped for smelting was made up of sulphide copper ore, oxidized and sulphide lead ore, siliceous silver ore, and a little gold and silver ore.

The ore output of the Chief Consolidated Mining Co. is given as 159,283 tons in 1926, but this total includes ore from the property of the Plutus Mining Co., a separate incorporation controlled by the Chief Consolidated Mining Co.; after transportation, sampling, and all operating charges were deducted the ore yielded a profit of $564,681. Four dividends paid on Chief Consolidated properties in 1926 aggregated $456,659.

The combined metal contents of the ores from the Chief Consolidated properties, including the Plutus mine, are given as follows in the company's annual report. The totals do not represent recovered metals but assay contents of ores milled and ores shipped for smelting.

Metal contents (assay) of crude smelting ore and mill ore from Chief Consolidated property and Plutus mine, 1925 and 1926

Year	Ore	Gold	Silver	Copper	Lead	Zinc	Net returns	
							From smelter	After charges
	Dry tons	*Ounces*	*Ounces*	*Pounds*	*Pounds*	*Pounds*		
1925	161,781	16,758	2,751,500	1,563,183	22,204,007	2,849,612	$2,441,215	$347,182
1926	159,283	10,152	2,577,530	1,467,029	31,566,687	14,674,965	[1] 3,079,861	564,681

[1] Includes income from lime products.

Of the 159,283 tons of ore produced from the Plutus and Chief Consolidated properties 53,944 tons of silver-lead ore and 28,124 tons of dry and siliceous ore were shipped for smelting; 26,724 tons of zinc-lead ore were shipped to the custom flotation plant at Midvale; and the concentrator at the Chief mine took 50,491 tons, of which

14,403 tons were silver-lead ore, 1,906 tons dry gold and silver ore, and 34,182 tons zinc-lead ore. These ores averaged as follows: Gold, $1.32; silver, 16.182 ounces; lead in lead ores, 15.26 per cent; copper in copper ores, 2.28 per cent; lead in zinc-lead ores, 8.80 per cent; and zinc in zinc-lead ores, 12.05 per cent. All ores averaged $35.94 a ton in total value, which, after $21.28 was deducted for smelting, freight, and sampling, left a net value of $14.66 a ton. Development (in drifts, raises, and winzes) in the Chief Consolidated properties—Nos. 1, 3, and 5 shafts—aggregated 10,542 feet, and the company also did 6,030 feet of work in the Plutus mine and 1,693 feet in the Eureka Lily property. The report says:

> The completion of the wet concentrating section of the milling plant in the first part of the year was effected and it has since been operating very successfully in winning a profit from the zinc contained in the ores which formerly entailed a loss and adding to the former profit on the other metals. The volatilization end of the mill has still been in adjustment as to some mechanical details and these we now feel have been completed and it is expected in the near future to apply the system to the oxide ores and thereby increase the profit derived from that class.
>
> There was a diminution in the earnings of the Chief this year but this was more than offset by the earnings of the Plutus mine, and the aggregate of both has made a total profit exceeded only by some of the odd years preceding. * * *
>
> We have recently inaugurated a line of geological research work with regard to the occurrence and the continuity of the ores which have shown in the past frequent interruptions. * * *

From the Eagle & Blue Bell mine[4] 26,510 dry tons of first-class ore were shipped, containing 1,693 ounces of gold, 327,113 ounces of silver, 4,958,225 pounds of lead, and 19,214 pounds of copper, for all of which the net smelter returns were $289,871. The mine is opened by a shaft 2,000 feet deep, and 4,223 feet of development was done in 1926. The gross income from operations was $410,250, operating expenses $315,860, and development $42,231. The net income from operating gain and other income was $108,677. Dividends distributed to stockholders in 1926 amounted to $44,657, making a total of $1,984,570 to date. The company's report says:

> Shipments of about 75 tons per day were maintained from the Eagle & Blue Bell. Tonnage and smelter returns were greater than in 1925, but earnings comparatively less. * * * The greater part of the output was obtained by exploiting the lead-silver deposit discovered in 1925 on the 1,350 level by long-hole drilling. Stoping was carried on for a considerable distance along the strike and above and below the level. Lead-silver was also discovered on the 1,550 level and followed 90 feet above the level. To facilitate development a connection was made late in the year between the 1,550 and the workings from the 1,350 level.

The Victoria property of the Bingham Mines Co. adjoining the Eagle & Blue Bell mine southeast of Eureka produced 17,357 dry tons of smelting ore containing 1,689 ounces of gold, 338,624 ounces of silver, 2,042,076 pounds of lead, and 138,203 pounds of copper, for which the smelter paid $227,243. About 3,500 feet of development was done in drifts, crosscuts, and raises. More than 61 per cent of the output was oxidized lead ore, about one-fourth was siliceous silver ore, and the remainder was oxidized copper ore. The report of the Bingham Mines Co. for 1926 includes the following note:

> At the Victoria, the bonanza ore body so highly productive in 1925 gave way to a low-grade product in an intensely fractured zone on the 1,400 level, resulting in a material falling off in earnings. But in November high-grade ore was dis-

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[4] Bingham Mines Co. Eighteenth Ann. Rept., for year ended Dec. 31, 1926.

closed on the 1,300 level, and subsequent development showed this to be a continuation of the main silver-lead channel.

The Tintic Standard and Iron Blossom mines [5] produced 144,802 dry tons of ore containing 7,089.86 ounces of gold, 3,691,241 ounces of silver, 47,528,206 pounds of lead, and 689,653 pounds of copper, which sold for $6,521,375. After smelter, freight, and treatment charges of $2,304,825 were deducted the net smelter returns amounted to $4,216,550. The lead ore, 88,094 tons, contained on the average 0.046 ounce of gold and 30.15 ounces of silver to the ton, 0.215 per cent of copper, and 24.17 per cent of lead. The dry silver ore shipped, 886 tons, could be classified as a copper ore; it contained on the average 0.105 ounce of gold and 166.64 ounces of silver to the ton, 8.61 per cent of copper, and 1.32 per cent of lead. The siliceous ore, 55,822 tons, contained on the average 0.053 ounce of gold and 15.90 ounces of silver to the ton, 0.310 per cent of copper, and 4.40 per cent of lead. The mining cost amounted to $1,157,296. Deduction of general administrative expense, $92,201, and annual depreciation of plant and equipment, $103,643, from the operating income left a net operating income, before allowance for depletion and Federal taxes, of $2,863,410, which was increased to $3,131,549 by $268,139 nonoperating income. Deduction of $224,087 for State and county taxes and licenses and $307,980 for Federal income taxes—a total of $532,067—left a net income of $2,599,482. On December 31 the total current assets of the company were $4,461,309. Dividends of $1,959,955 were paid in 1926, making a total of $7,482,669 to date. The property is opened by a vertical shaft 1,450 feet deep; about 8,900 feet of development, chiefly in drifting, was done during 1926. The mill at Harold has been idle since November, 1925, and in 1926 the entire output, both the lead ore and the siliceous silver ore, was shipped for smelting. The company report gives no details regarding ore reserves or development; it gives the output of the Tintic Standard mine to date—the ore shipped or milled with metal content—as follows: 1,012,879 tons of ore, 34,928.76 ounces of gold, 26,405,442 ounces of silver, 8,377,988 pounds of copper, and 247,085;216 pounds of lead.

The property of the Alaska Mining Co. produced about five cars of lead-zinc ore which was shipped to Midvale for treatment in the custom flotation plant.

The American Star mine, controlled and operated by the Bingham Mines Co., produced more than 2,500 tons of siliceous silver ore for smelting; the ore occurs as a replacement in limestone. The property lies east of the Eagle & Blue Bell mine and is worked through the Eagle & Blue Bell shaft. During the year 2,423 feet of work was done in drifts, crosscuts, and raises, but work on the 1,700 and 1,650 levels did not succeed in picking up the southern extension of the No. 2 ore body.

The Empire Mines Co. shipped nearly 1,500 tons of ore; more than half of this was oxidized lead ore and the remainder was siliceous silver ore. The property is opened by the Lower Mammoth shaft, 2,000 feet deep, and further sinking was done early in the year to explore the Ophir formation.

The Bullion Beck & Champion mine was not worked, but 39,149 tons of old tailings containing more than 2,000,000 pounds of lead and considerable silver were shipped from the dump.

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[5] Tintic Standard Mining Co. Ann. Rept., for year ended Dec. 31, 1926.

No work was done on company account at the Centennial Eureka property, controlled by the United States Smelting, Refining & Mining Co., but lessees shipped several hundred tons of oxidized copper ore.

The Godiva Mining Co. shipped several cars of first-class oxidized lead ore and shipped also old siliceous silver tailings for smelting.

The Gold Chain Mining Co. shipped several hundred tons of copper ore and lead ore containing gold and silver and spent nearly $12,000 in development, which was carried on from the 1,800-foot level of the property of the Empire Mines Co.

The Iron Blossom mine near Silver City on the Eureka Hill Railroad was worked by the Tintic Standard Mining Co. It produced more than 13,000 tons of smelting ore; half of this was siliceous silver ore and the remainder was chiefly sulphide lead ore, with some silver-copper ore. Bismuth is said to occur in sufficient quantity to make a commercial product. The property is opened by two shafts, one of which is 2,200 feet deep; nearly 8,000 feet of drifting and raising was done during 1926. Most of the ore was mined from the 1,100-foot level or above; an unusual amount of development was done to prospect the property thoroughly at depth. The metal output of the Iron Blossom mine is included in the statement of the Tintic Standard Mining Co. (See p. 492)

The Mammoth mine, which has been a regular producer since 1870, was rejuvenated by the finding of a new ore body in 1925. The company was an important producer of both silver and lead in 1926 and shipped about 35,000 tons of oxidized lead ore and siliceous silver ore for smelting. The property is opened by a shaft 2,100 feet deep and by 30 miles of other workings; about 4,000 feet of development was done during 1926. Dividends amounting to $237,188 were paid in 1926, making a total of $3,126,251 to date.

More than 100,000 tons of old tailings, containing a large quantity of both gold and silver, with some copper, were shipped from the Mammoth tailing dump in 1926; this dump was purchased by the American Smelting & Refining Co. in 1924.

The Plutus Mining Co., the stock of which is controlled but not completely owned by the Chief Consolidated Mining Co., shipped more than 30,000 tons of first-class silver-lead ore and siliceous silver ore. Although the company is a separate incorporation, the detailed figures of production are not made public but are included in the totals of the printed report of the Chief Consolidated Mining Co. (See p. 490.) More than 6,000 feet of development, chiefly in drifts and raises, was done in 1926. The Plutus company was the fifth largest producer of silver and the ninth largest producer of lead in Utah and paid $299,863 in dividends in 1926.

Other producers in the Juab County part of the Tintic district in 1926 were the Silver Park, Swansea, Sunbeam, and Dragon mines.

In the eastern part of the Tintic district in Utah County the chief producers were the Tintic Standard (for review, see p. 492), Yankee Consolidated, Mountain View, Iron King, and Colorado Consolidated properties; small lots of ore were shipped from the Apex Standard, Eureka Lily, and Zuma properties.

The Colorado Consolidated Mines Co. shipped more than 2,000 tons of material in 1926; this was primarily silver-lead ore, but some of it was oxidized lead-zinc ore which was shipped to Coffeyville, Kans.

Only a small lot of lead ore was shipped from the Eureka Lily property, which lies west of the Tintic Standard mine and is controlled by the Chief Consolidated Mining Co.; 1,600 feet of development was done in 1926 in drifting and raising. The following paragraph is taken from the report of the Chief Consolidated Mining Co. for 1926:

> Since our last report, discovery of ore has been made in the Eureka Lily property, the stock control of which is owned by this company. * * * We have every reason to believe that this discovery will prove the existence of an additional mine, and because of its situation geologically, and the high grade character of the ores of the Tintic Standard mine and other ore since discovered by the International Smelting Company adjoining the Eureka Lily property, this new deposit may prove to be of the same class. * * * Entire credit for this discovery is due to the smelting company, it having made this find in a drift which it was driving through Eureka Lily ground to reach its own property. * * * It will undoubtedly take some time to make developments there, probably involving the sinking of a new shaft.

The Iron King property produced several cars of ore, valuable chiefly for its gold and silver. The company spent more than $20,000 in development and shipped considerable oxidized iron ore to the plant of the Columbia Steel Corporation at Ironton, near Springville.

Several hundred tons of oxidized lead ore and some old silver tailings were shipped from the Uncle Sam and May Day properties, worked by the Mountain View Mining Co.

Approximately 5,000 feet of development was done in theYankee Consolidated property, which is controlled by the International Smelting Co. Several hundred tons of lead ore, with some silver ore, were shipped for smelting.

West Tintic district.—One car of lead ore from the Tintic Delaware mine was shipped from Jericho.

MILLARD COUNTY

Antelope (Mineral Range) district.—One car of sulphide lead ore was shipped by the East Antelope Mining Co., which operated claims 8 miles east of Black Rock on the Los Angeles & Salt Lake Railroad of the Union Pacific system.

Kanosh district.—The Blue Bell property produced several hundred tons of first-class oxidized lead ore from surface workings 12 miles south of Kanosh.

MORGAN COUNTY

Argenta district.—The North Maxfield Mining Co. operated the Carbonate Hill mine near Peterson and shipped more than 200 tons of oxidized lead ore containing a little silver.

PIUTE COUNTY

Mount Baldy district.—The mill of the Deer Trail Mining Co. at Marysvale was idle, but more than 200 tons of oxidized lead ore and siliceous gold ore were shipped from the Deer Trail mine to Midvale for smelting. The property was a large producer of gold, silver, and lead from 1917 to 1923; the metal output in 1922 was valued at about $735,000; the company paid a total of $177,745 in dividends in 1921 and 1922.

Ohio district.—Several cars of rich gold ore, with a little sulphide copper ore, were shipped from the Gold Strike mine in Bullion Canyon by the Four Metals Mining Corporation. The Bully Boy and Webster claims were worked a short time by the Utah Lead Co., which shipped several cars of lead ore and concentrate to the smelter at Midvale.

SALT LAKE COUNTY

Salt Lake County, chiefly the Bingham district, is the most important mining center of Utah. The metal output of the county increased to $52,651,244 in 1926, or to nearly 64 per cent of the value of the State output. The mines of Bingham have been large producers since the early days of mining. Their output increased greatly after the Utah Copper Co. started steam-shovel mining in 1907, and the value of the county's metal output in 1926 was nearly four times that of 1907.

Big and Little Cottonwood districts.—The production of the mines at Alta in Little Cottonwood Canyon and of those along Big Cottonwood Canyon has been combined in the following table:

Mine production of gold, silver, copper, lead, and zinc in Big Cottonwood and Little Cottonwood mining districts, Utah, 1925 and 1926, and total, 1867–1926

Year	Mines producing	Ore and slag	Gold	Silver	Copper	Lead	Zinc	Total value
		Short tons		*Fine ounces*	*Pounds*	*Pounds*	*Pounds*	
1925	16	[1] 13, 565	$5, 781	254, 753	212, 221	4, 748, 256	----------	$625, 813
1926	15	10, 907	5, 096	206, 498	449, 069	3, 194, 890	360, 270	479, 433
Total, 1867–1926	--------	596, 365	558, 327	16, 211, 737	15, 358, 372	228, 810, 926	682, 325	32, 941, 583

[1] Includes 1 ton of slag.

In the Big Cottonwood district six mines made the output of 5,065 tons of ore, which yielded $1,516 in gold, 95,239 ounces of silver, 137,863 pounds of copper, 1,785,181 pounds of lead, and 350,209 pounds of zinc, valued in all at $249,326, or $49.23 in metals a ton. Most of the lead ore came from the Cardiff mine. The ore from the Cardiff mine was taken out during development that embraced 109 feet of raising and 1,503 feet of drifts and was hauled 12 miles from South Fork down Big Cottonwood Canyon to either Murray or Midvale for smelting; also, several lots of lead-zinc ore from this mine were shipped to Coffeyville, Kans., and some lead-zinc ore was milled at Midvale. The chief product of the Cardiff mine in 1926, however, was first-class silver-lead ore; the chief minerals are galena, tetrahedrite, sphalerite. and pyrite; no dividends were distributed by the company in 1926. Small lots of lead ore carrying silver were shipped from the Maxfield, Richmond Tressa, and Alta Tunnel properties. A little siliceous gold ore and copper ore came from the Golden Porphyry mine and a test lot of lead-zinc ore came from the Howell property.

In the Little Cottonwood district nine mines made the output of 5,842 tons of ore, which yielded $3,580 in gold, 111,259 ounces of silver, 311,206 pounds of copper, 1,409,709 pounds of lead, and 10,061 pounds of zinc, valued in all at $230,107, or $39.39 in metals a ton. The largest producers of ore in the Little Cottonwood district in 1926 were the Michigan-Utah, Mineral Veins Coalition, Columbus Rexall, West Toledo, and Monetaire properties.

The Michigan-Utah Consolidated Mines Co. shipped nearly 2,600 tons of oxidized silver-lead ore to the Midvale smelter; the ore is hauled 5 miles to Wasatch, where it is loaded on railroad cars. The Columbus Rexall property produced about 500 tons of oxidized lead ore and copper ore. Development was continued at the Emma Silver property, but only one car of silver-lead ore was marketed. The Columbus and Flagstaff properties, owned by the Mineral Veins Coalition Mines Co., produced about 2,500 tons of ore, of which about half was lead ore and half copper ore; a little lead-zinc ore was shipped to Midvale for flotation tests. Two cars of lead ore were shipped from the Monetaire mine, controlled by the Columbus Rexall Consolidated Mines Co. About 600 feet of development was done at the Alta Merger property, but only one car of oxidized lead ore was shipped for smelting. The West Toledo Mining Co. shipped several cars of carbonate lead ore; the mine has become famous for the occurrence of large and beautiful specimens of cerussite, and one of unusual size has been sent to the National Museum at Washington, D. C.

Bingham or West Mountain district.—In 1926 the mines of the Bingham district produced ore yielding on the average $3.53 in metals a ton, against $3.62 a ton in 1925. Shipments of ore to the smelter amounted to 141,547 tons, against 210,818 tons in 1925; the output of concentrating ore was 14,379,925 tons, against 12,929,532 tons in 1925; and the quantity of concentrates produced was 904,168 tons, against 751,870 tons in 1925. The ore of smelting grade, amounting to 141,547 tons, consisted of copper and lead sulphides; it yielded 13,519.34 ounces of gold, 936,811 ounces of silver, 6,081,700 pounds of copper, and 27,894,812 pounds of lead, valued in all at $3,947,063, or $27.89 a ton. The milling ore (14,379,925 tons) produced 904,168 tons of copper, lead, zinc, and iron concentrates yielding 106,945.97 ounces of gold, 2,591,649 ounces of silver, 236,706,353 pounds of copper, 82,098,287 pounds of lead, and 50,762,818 pounds of zinc, valued in all at $47,341,922, or $52.36 in metals to a ton of concentrates. In addition, copper precipitates, recovered from mine water and from leaching of ore in place, yielded 6,187,049 pounds of copper.

Mine production of gold, silver, copper, lead, and zinc in Bingham or West Mountain district, Utah, 1925 and 1926, and total, 1865–1926

Year	Mines producing	Ore	Gold (lode and placer)	Silver (lode and placer)	Copper [1]	Lead	Zinc	Total value
		Short tons		*Fine ounces*	*Pounds*	*Pounds*	*Pounds*	
1925	29	13,140,350	$2,336,932	[2] 3,433,478	[2] 227,612,035	109,964,255	26,355,731	$48,610,601
1926	26	14,521,472	2,490,239	3,528,460	[3] 248,975,102	109,993,099	50,762,818	52,155,171
Total, 1865–1926	-------	(4)	46,968,794	67,908,676	3,145,775,956	1,648,472,565	146,855,017	743,107,450

[1] Includes copper saved from precipitates.
[2] Includes 12 ounces of silver and 7,359,866 pounds of copper saved from precipitates.
[3] Includes 6,187,049 pounds of copper saved from precipitates.
[4] Figures not available.

NOTE.—Total dividends, 1865–1926, $160,890,153.

Mine production of gold, silver, copper, lead, and zinc in Bingham or West Mountain district, Utah, in 1926, by kinds of ore

Kind of ore	Mines producing	Ore	Gold	Silver	Copper	Lead	Zinc
		Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Dry and siliceous	8	1, 349	402. 28	7, 369	15, 714	10, 275	
Copper	13	13, 921, 752	92, 600. 03	1, 013, 023	[1] 243,560, 820	432, 612	
Lead	18	99, 658	6, 570. 57	774, 769	2, 175, 333	27, 648, 045	
Lead-zinc	13	498, 713	20, 892. 43	1, 733, 299	3, 223, 235	81, 902, 167	50, 762, 818
	[2] 26	14, 521, 472	120, 465. 31	3, 528, 460	248, 975, 102	109, 993, 099	50, 762, 818

[1] Includes 6,187,049 pounds of copper saved from precipitates.
[2] A mine producing more than one class of ore is counted but once in arriving at total for all classes.

During 1926 the Utah Copper Co.[6] produced 38,028 tons of ore a day, or a total of 13,880,100 tons of ore that contained 1.01 per cent of copper. This ore was mined by steam and electric shovels and treated at the Magna and Arthur concentrating plants. Metals recovered from concentrates during 1926, together with 738,971 pounds of copper precipitated from mine waters, amounted to 234,173,625 pounds of copper, 760,910 ounces of silver, and 86,028.04 ounces of gold, valued in all at $34,724,121. There were also 4,435 tons of copper and lead ores produced by leasers. The concentrate shipped to the smelter averaged 17.07 per cent of copper in 1926, against 17.47 per cent in 1925.

After all operating charges of production, including cost of marketing refined copper, the direct profits from mining operations for the year were $14,160,637. Indirect earnings for the period, accruing as miscellaneous income incident to operations, amounted to $2,425,749, which made a total income of $16,586,386. The audit report shows deductions for other charges, including Federal income tax accruals, depreciation of plant and equipment, and obsolescence or retirement of property, aggregating $2,777,075, leaving a net income carried to surplus account of $13,809,311, or approximately $8.50 per share of capital stock outstanding.

Dividends paid to stockholders in 1926 amounted to $5.25 a share, or a total of $8,528,572, of which about one-sixth was capital distribution. The aggregate distributions paid to stockholders up to December 31, 1926, were $147,248,442. A revised calculation of developed ore reserves on December 31, 1926, as they will be mined, gave 564,000,000 tons of milling ore carrying approximately 1.10 per cent of copper. The total ore mined to date was 145,774,651 tons. Therefore, the total ore mined and to be mined from the beginning of mining to the exhaustion of the estimated reserves approximates 710,000,000 tons.

The mining cost for a ton of ore milled, including a proper apportionment of fixed general charges (but not including Federal taxes and depreciation), was 31.39 cents, of which 12.5 cents represents proportional "prepaid" stripping charges. The actual direct mining cost of all ore was 18.89 cents a ton, of which 15.21 cents represents all mine charges; the balance, or 3.68 cents, represents fixed and general charges.

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[6] Utah Copper Co. Twenty-second Ann. Rept., for year ended Dec. 31, 1926.

The ore treated at the Magna and Arthur plants was 7,454,200 tons and 6,425,900 tons, respectively, or a total of 13,880,100 tons, equivalent to a daily average of 38,028 tons. The average content of the ore was 1.01 per cent of copper, as compared with 1.02 per cent of copper in 1925; and the average recovery in the form of concentrates was 87.01 per cent, as compared with 86.96 per cent in 1925. The average milling cost was 48 cents a ton, a decrease of 6 cents from the cost of 1925.

The average cost per net pound of copper, including depreciation of plant and equipment and all fixed and general expenses and after crediting gold, silver, and miscellaneous earnings, was 7.94 cents, compared with 8.43 cents, computed on the same basis, for 1925. The value of the gold and silver recovered and the miscellaneous earnings amounted to 1.36 cents per pound of copper, which is the same as for the previous year. The report continues:

> The Starless group of mining claims, comprising 110.22 acres, was purchased during the year. This addition makes the grand total of mining ground owned by the Utah Copper Company in the Bingham district 992.62 acres. * * *
>
> The total ore mined to date is 145,774,651 tons. * * *
>
> In order to keep stripping far enough advanced to permit the proper conduct of mining operations, there was removed 8,633,769 cubic yards of capping, bringing the total to the end of the year up to 79,825,135 cubic yards. * * *
>
> During the year mining operations were continued in the upper and marginal portions of the mine where the ore is of lower grade than the average of the ore body. * * *
>
> During the year six steam shovels were converted to electrically operated shovels, so that at the end of the year all of the 23 shovels in use at the property were electrically operated. The necessary power transmission lines to supply electric current to the shovels were constructed. One 60-ton oil-electric locomotive was purchased. * * *
>
> In order to prepare for the removal of the ore on the east side of the canyon, two and one-half miles of stripping lines were constructed and stripping operations will be carried on continuously in that section of the mine. * * *
>
> Improvements which have been in progress at the mills for the past several years, looking to an economic capacity of 50,000 tons per day for both plants, were completed. The principal items of these were increased crushing and grinding capacity and improved classifying and flotation apparatus.
>
> The concentrates shipped to the smelter contained 244,026,905 gross pounds of copper, the average grade being 17.07 per cent as compared with 222,978,209 pounds and 17.47 per cent for the year 1925. The precipitates derived from mine waters contained an additional 756,380 pounds of copper.

In the decade 1917 to 1926 the company has treated 91,095,951 tons of ore and produced 779,138 tons of net copper. The equipment of the remodeled Magna and Arthur mills is described in the Mines Handbook for 1926. Both mills are now flotation plants using an alkaline circuit with sodium xanthate and lime. In December tests were being made to drop the pyrite and make a higher grade copper concentrate containing chiefly chalcocite and chalcopyrite.

The output of ore from the United States Smelting, Refining & Mining Co.'s mines[7] at Bingham, including the Niagara property, amounted to 197,428 tons of lead-zinc ore, a decrease of 12,043 tons from that of 1925. Most of this ore was shipped from Bingham to the concentrator at Midvale where it was treated by flotation in the new 800-ton plant and reduced to zinc concentrate, lead concentrate, and an iron concentrate which contains gold and silver as well as a small quantity of copper and lead. The zinc concentrate was shipped to Bartlesville, Okla., and Great Falls, Mont., and the lead concentrate and iron concentrate were smelted locally. Several thousand tons of first-class lead ore and copper ore were shipped direct for smelting. The property ranked first in production of zinc, fourth in lead, and second in gold in Utah in 1926. The mine is worked through the Niagara tunnel and at greater depth through the Butterfield tunnel. Development was kept well ahead of production; details are not published.

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[7] United States Smelting, Refining & Mining Co., Ann. Rept. for 1926.

The Utah-Delaware Mining Co. worked the Highland Boy and Yampa groups and produced approximately 175,000 tons of ore, which was mainly lead-zinc mill heads treated at the International flotation plant. About 20 per cent of the mine output was first-class copper ore and lead ore directly smelted. An aerial tramway at the head of Carr Fork takes the ore to the mill and smelter at International. The property is controlled by the International Smelting Co., a subsidiary of the Anaconda Copper Mining Co.; it has in reserve more than a year's supply of lead-zinc ore, as well as considerable copper ore. It ranked third in the production of zinc, fourth in copper, sixth in gold, and sixth in lead in Utah in 1926, although work was interrupted for a time in February by a serious snowslide. During the year more than 16,000 feet of development was done in drifts, crosscuts, and raises. According to the printed report of the Anaconda Copper Mining Co., the Utah-Delaware mine produced 11,112 tons of copper ore and 134,170 tons of lead-zinc ore. In addition, 24,564 tons of lead-zinc ore were produced by lessees operating on a royalty basis. A dividend of $200,000 was said to have been paid to stockholders, although it was not mentioned in the printed report.

The Utah-Apex Mining Co. produced, according to a report to the Bureau of Mines for the calendar year 1926, 211,113 tons of ore, of which 68,978 tons were shipped direct to the smelters; 142,135 tons were milled and produced 22,346 tons of lead concentrate, 10,316 tons of zinc concentrate, and 806 tons of copper concentrate. Some of the ore was sold to custom mills where lead, zinc, and iron concentrates were produced. The lead concentrate contained 2,152.06 ounces of gold, 369,258 ounces of silver, 1,164,959 pounds of copper, and 23,244,182 pounds of lead. The zinc concentrate contained 245.08 ounces of gold, 24,400 ounces of silver, 271,578 pounds of copper, 455,852 pounds of lead, and 10,321,531 pounds of zinc. The ore shipped direct to smelters (68,978 tons), including 5,752 tons of lead-zinc mill ore reshipped to a custom plant, contained 4,974.97 ounces of gold, 361,443 ounces of silver, 3,979,621 pounds of copper, and 11,647,211 pounds of lead. This ore also contained 3,430,133 pounds of zinc, of which only a small part was saved. The company ranked third in the production of copper and lead and fourth in zinc in Utah in 1926. Dividends aggregating $633,840 were paid during the year. Reserves are estimated at 100,000 tons of lead-zinc ore, averaging 8 per cent of lead and 5 per cent of zinc and about 50,000 tons of lead-copper mill ore. The mine is developed by two vertical shafts, 1,400 and 2,500 feet, respectively, with various drifts and raises. In 1926 more than 16,000 feet of development was done, principally in drifts and crosscuts, and the 2,500-foot level was developed to open the ore found on the 2,000 and 2,400 levels above. The property is equipped with a 750-ton flotation mill, which was considerably improved late in the year. The mill made chiefly a lead concentrate and a zinc concentrate from the lead-zinc ore, but in November it was also producing a copper concentrate. In addition to high-grade zinc and lead concentrates marketed, the lead-copper mill ore was sent to the lead section and the tailings to the copper section, making a copper product containing about 20 per cent of copper. The company also shipped nearly 20,000 tons of first-class sulphide copper ore. The following notes are taken from the company's fiscal report for the year ended August 31, 1926:

> The ore mined in the ordinary operations came largely from the Sambo and Petro veins and their associated ore bodies, and from the Leadville fissure zone in the Highland Boy limestone from the 1,600 level to the 2,400 level. * * *
>
> During the year 1925–26 many improvements were made in the preparation of our products for the market. The lead-zinc ore has been treated in our mill by differential flotation where the two metals are separated and concentrated into high-grade products before marketing. Since November, 1925, and up to the end of the fiscal year, this plant has produced 8,312,673 pounds of zinc in the form of a zinc concentrate. * * *
>
> In April, 1926, it was decided to proceed with the construction of a 300-ton plant for the treatment of this ore as an addition to our present mill. This involved a new coarse-crushing plant and a new thickening and filtering plant, in addition to fine grinding and flotation equipment, all of which was to be installed without interfering with the operations of the lead-zinc plant.
>
> The capacity of the new crushing plant, which will handle all of the ore milled, is in excess of 1,000 tons; the fine grinding and flotation plants will handle 750 tons, divided into 300 tons lead-zinc and 450 tons of lead-copper ore. The capacity of the new thickening and filtering plant is considerably in excess of present and probable demands. * * *
>
> Milling results of the lead copper section, which was started about November 1, are very satisfactory. We are producing 20 per cent to 25 per cent copper concentrate and 45 per cent to 50 per cent lead concentrate.

The company received $2,926,300 from the sale of ore, from royalties, etc. Mining, milling, and development cost $1,717,927; after general expenses were paid a balance of $781,985 was left before providing for depletion and the Federal income tax.

The Bingham Mines Co.[8] operated the Dalton & Lark group at Lark and leased the Commercial mine at Bingham. Production from the Commercial property (all by lessees) was comparatively small, consisting of lead-zinc mill ore, first-class copper ore, and lead ore; the lead-zinc ore was shipped to International for milling. The Dalton & Lark property produced chiefly first-class lead ore, of which about 10 per cent was oxidized. The company has become a fairly important producer of zinc by shipping lead-zinc ore to a custom flotation plant. Nearly 3,000 feet of development was done in various underground workings in 1926, and the company paid $150,000 in dividends from the profits of the Bingham and Tintic holdings. The output of the company's mines near Bingham is given as follows:

Mine production of gold, silver, copper, lead, and zinc from mines of the Bingham Mines Co., Bingham, Utah, in 1926

Mine	Ore	Gold	Silver	Copper	Lead	Zinc	Smelter returns
	Dry tons	*Ounces*	*Ounces*	*Pounds*	*Pounds*	*Pounds*	
Dalton & Lark	32,902	930	337,758	593,814	7,775,400	2,235,573	$443,644
Commercial	905	43	6,471	109,349	174,367	121,006	18,809
	33,807	973	344,229	703,163	7,949,767	2,356,579	462,453

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[8] Bingham Mines Co. Eighteenth Ann. Rept., for year ended Dec. 31, 1926.

The company's report continues:

> By adhering to a regular plan of development, the Dalton & Lark property is now in excellent physical condition. The various oreshoots all show persistence in depth, both as to size and metal contents; and the discovery of two new ore bodies enhances the prospective value of the large areas yet to be explored. It should be noted, also, that the production of lead-zinc is adding materially to the earnings of this property. Shipments from the Revere workings averaged 0.046 ounce gold, 5.26 ounces silver, 16.53 per cent lead, and 18.05 per cent zinc. This product is concentrated by the selective flotation process, and a large percentage of the zinc content is, therefore, recovered. * * *

The company received $898,341 from ore shipments, royalties, etc., and had a surplus of $2,091,260 at the end of 1926.

Leaching of ore in place continued during 1926 at the property of the Ohio Copper Co.;[9] an output of 4,963,761 pounds of refined copper was made at a cost of 8.9985 cents a pound, compared with 6,271,556 pounds at 8.3216 cents a pound in 1925. The net profits, after deduction of fixed charges, taxes, adjustments, etc., but not depreciation and depletion, amounted to $140,261. A balance of $33,017 was transferred to the surplus account, which left a deficit of $96,015. Every effort was made to solve the water difficulty, and vertical boundary line agreements were made with neighboring companies. On September 15 the company paid a dividend of 3 per cent, amounting to $86,454. The treatment consists in circulating slightly acidified water over the brecciated zone and caved ore body and precipitating the copper on detinned scrap iron; the precipitates are collected and shipped for smelting.

More than 10,000 feet of development was done at the property of the Utah Metal & Tunnel Co. The property produced about 2,500 tons of mixed ore, chiefly lead-zinc ore treated at a custom flotation plant. First-class copper ore and lead ore and lead-zinc mill ore were carried 4½ miles to International by an aerial tramway. In addition to the work done by the company, 2,638 feet of development was done by the Utah-Delaware Mining Co. in leased ground. The company received $88,238 from the sale of ore and water and from rents. The operating expenses were $171,104, and $71,127 was spent for development. The net loss, including charges for depletion and depreciation, was $165,515. The annual report of the company for 1926 says:

> The objective of the coming year's work is to develop the large lime beds in regions where ore or ore-bearing fissures have been proven by the development work already done. To accomplish this our engineers propose to follow in the lime beds with suitable workings in such a direction as to cut the known fissures.
>
> Two long crosscuts were driven west of Occidental fault. In both these crosscuts several smaller lime beds were exposed and a number of faults and fissures were also cut. In one there was exposed a part of the upper lime bed of this district (Yampa lime). In the other crosscut this lime bed was crossed and a good part of the lower large lime bed (Highland Boy) was cut. Another crosscut on our 850 level was started in which some 500 feet of work has been done. * * *

The Montana Bingham property, including the Fortuna, Eddie, and Tiewaukee groups, controlled by the Bingham Mines Co., produced oxidized lead ore, some silver ore, and copper from mine-water precipitates. The company received $49,777 from the sale of 1,083 dry tons of ore and 142 tons of copper precipitates. Development consisted of 3,395 feet of work, chiefly in the Tiewaukee group.

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[9] Ohio Copper Co. Ann. Rept., for year ended Dec. 31, 1926.

The company has a large surplus, but the deficit for the year was $32,992.

The Bingham Metals Co. worked the New England mine and shipped nearly 2,000 tons of first-class lead ore, as well as lead-zinc ore for concentration and separation at a custom flotation plant. More than 2,000 feet of development was done, mainly in crosscuts and drifts. During the year a connection was made with the Niagara tunnel level of the United States Smelting, Refining & Mining Co., which serves to drain the mine and reduce the cost of transportation; pumping of water and hauling of ore by wagons have thus been eliminated.

The Silver Shield and Bully Boy properties were worked by the Park-Bingham Mining Co. and produced sulphide lead ore for smelting and also considerable lead-zinc ore for milling at Midvale. The mill ore contains galena, sphalerite, and pyrite, but lead predominates. The property is worked through the Butterfield tunnel, which is connected with the Niagara level of the United States Smelting, Refining & Mining Co.

The New York & Great Western Mining, Smelting & Development Co. shipped several cars of lead-zinc ore to be treated at Midvale.

Small lots of ore were also shipped from the Silver Gauntlet, Lucky Boy, Chicago, Lead-Silver Mines Co., and Queen (Lavagnino) properties.

At Garfield, north of Bingham, the American Smelting & Refining Co. operated its copper smelter on custom ore that was chiefly concentrate from the Magna and Arthur mills of the Utah Copper Co. In June three reverberatories were run, and more than 20,000,000 pounds of copper bullion a month were shipped East for refining.

Smelter district (*Midvale and Murray*).—Ore in small lots from car and track cleanings, slag, and old tailings in the Smelter district amounted to 1,889 tons in 1926. No mines are operated in the region, but it is a milling and smelting center of importance.

At Midvale the lead smelter of the United States Smelting, Refining & Mining Co.[10] treated 232,150 tons of marginal ore and concentrates, producing 49,615 tons of lead bullion, a decrease of 35,028 tons of marginal material treated and 711 tons of bullion recovered as compared with 1925. The plant has seven blast furnaces, of which four or five were active in 1926. In addition to the lead bullion produced, matte, arsenic, and cadmium are also recovered. In the last eight years the works have produced 306,181 tons of lead bullion, an average of 38,272 tons a year, and during this period the smelting plant has treated 1,801,296 tons of ore and concentrate with seven blast furnaces, an average of 225,162 tons a year. The report says:

> The new flotation mill at Midvale, which was placed in operation early in the year, has operated at capacity with gratifying results. Its capacity has again been increased by the addition of certain machinery, so that it now has a capacity of 800 tons of complex lead-zinc ore per day. * * *

A detailed description of the mill was given in an article [11] published in 1926. In October the capacity of the new mill was increased to

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[10] United States Smelting, Refining & Mining Co., Ann. Rept. for 1926.

[11] Geary, G. F., "Design and construction of the Midvale mill": Eng. and Min. Jour.-Press, vol. 121, June 5, 1926, p. 917.

800 tons by adding a rod mill, Dorr thickener, flotation cells, and filter. From 1919 to 1926 this new mill and the old concentration mill have treated 1,194,905 tons of ore, an average of 149,363 tons a year for the eight years.

Old tailings from the Midvale concentration plant were re-treated in 1926 at the Peck plant, which is a pilot mill using a centrifugal concentrator. The product was shipped to the Midvale lead plant.

At Murray the American Smelting & Refining Co. operated its lead plant, running five of the eight blast furnaces. The plant is large and modern and is equipped with sampling mills, Wedge and Godfrey roasters, Dwight-Lloyd sintering machines, blast furnaces, flue system, Cottrell treaters, and bag house. Lead bullion is shipped East for refining, lead-copper matte is shipped to Garfield, and arsenic dust to Colorado. No copper or lead bullion is now refined in Utah, although there was a refinery at Murray as early as 1872. An interesting review [12] of lead smelting in Utah was published in August, 1925.

SAN JUAN COUNTY

Red Canyon district.—Some exceptionally fine placer gold was recovered in Red Canyon and shipped to the Denver Mint. The shipping point for the property is Hanksville in Wayne County.

SUMMIT AND WASATCH COUNTIES

The Blue Ledge and Snake Creek districts in Wasatch County and the Uintah district in Summit County represent the producing area of the Park City region.

Mine production of gold, silver, copper, lead, and zinc in Park City mining region, Utah, 1925 and 1926, and total, 1870–1926

Year	Mines producing	Ore and old tailings	Gold	Silver	Copper	Lead	Zinc	Total value
		Short tons		*Fine ounces*	*Pounds*	*Pounds*	*Pounds*	
1925	18	[1] 635,204	$353,401	7,236,652	2,465,670	81,312,417	23,240,364	$14,566,210
1926	14	[2] 693,629	393,271	6,620,817	2,279,281	71,819,276	33,036,777	13,067,061
Total, 1870–1926	-------	(3)	6,050,581	175,350,581	44,624,499	1,646,022,256	144,865,343	241,650,641

[1] Includes 141,417 tons of old tailings.
[2] Includes 211,465 tons of old tailings.
[3] Figures not available.

NOTE.—Total dividends, 1870–1926, $54,064,498.

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[12] Sacket, B. L., "Lead smelting in Utah": Trans. Am. Inst. Min. and Met. Eng., No. 1486–D, August, 1925.

Mine production of gold, silver, copper, lead, and zinc in Park City mining region, Utah, in 1926, by kinds of ore

Kind of ore	Mines producing	Ore and old tailings	Gold	Silver	Copper	Lead	Zinc
		Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Dry and siliceous	4	[1] 37, 054	1, 805. 27	790, 423	108, 893	492, 075	----------
Lead	6	32, 019	1, 343. 15	974, 441	439, 197	13, 544, 777	----------
Lead-zinc	9	[2] 622, 056	15, 874. 03	4, 855, 233	1, 729, 991	57, 776, 664	32, 917, 437
Zinc	1	[3] 2, 500	2. 00	720	1, 200	5, 760	119, 340
	[4] 14	693, 629	19, 024. 45	6, 620, 817	2, 279, 281	71, 819, 276	33, 036, 777

[1] Includes 2,465 tons of old tailings sold to a smelter.
[2] Includes 206,500 tons of old tailings reconcentrated.
[3] Consists of old tailings reconcentrated.
[4] A mine producing more than one class of ore is counted but once in arriving at total for all classes.

The output of the Park City region came chiefly from the Silver King Coalition, Daly West, Daly Judge, Keystone, and Ontario mines at Park City and from the Park Utah property, which is east of the Ontario mine and has its outlet at the mouth of the Ontario drain tunnel at Keetley.

The Silver King Coalition Mines Co.[13] produced 18,566 tons of crude ore (including 63 tons of lease ore) which were shipped direct to the smelters, and 114,874 tons of second-class or mill ore, a total of 133,440 tons. There was a marked decrease in the first-class ore shipped and an increase in ore milled, resulting in a general decrease in gold, silver, copper, and lead, but a large increase in the zinc output. The cost of production was $1,682,776, or $12.61 a ton, for mining, milling, and other charges, including depreciation ($70,373). Taxes amounted to $216,410, making the total expenditure $1,899,186. The net operating profit in 1926 was $1,312,626. The milling ore yielded 21,331 tons of lead concentrate, 1,873 tons of iron concentrate, and 8,061 tons of zinc concentrate. The accompanying table gives the average metal contents of all products from the property:

Gold, silver, copper, lead, and zinc contained in products of Silver King Coalition mine, Utah, in 1926

Kind of material	Gold		Silver		Copper		Lead		Zinc		Net smelter returns
	Total	Per ton	Total	Per ton	Total	Percentage	Total	Percentage	Total	Percentage	
	Ounces	*Ounce*	*Ounces*	*Ounces*	*Pounds*		*Pounds*		*Pounds*		
First-class ore	789. 35	0. 0427	546, 713	29. 55	318, 990	0. 86	10, 311, 707	27. 86	----------	-----	$841, 373
Lead concentrate	1, 739. 23	. 0815	1, 105, 442	51. 82	575, 445	1. 35	21, 937, 630	51. 42	----------	-----	1, 919, 678
Iron concentrate	58. 65	. 0313	19, 568	10. 45	12, 525	. 33	555, 577	14. 83	----------	-----	40, 200
Zinc concentrate	158. 21	. 0196	115, 444	14. 32	89, 633	. 56	1, 067, 409	6. 62	8, 421, 164	52. 23	315, 443
Lessees' ore	27. 21	. 4319	5, 133	81. 48	3, 078	2. 44	39, 450	31. 31	----------	-----	1, 750
	2, 772. 65	-------	1, 792, 300	-------	999, 671	-----	33, 911, 773	-----	8, 421, 164	-----	3, 118, 444

The 500-ton mill, which used gravity concentration and flotation, was greatly improved in June by the addition of more flotation machinery. Early in 1927 the plant had a capacity of 800 tons a day, but was treating only about 400 tons. Virtually all the equipment was that used for differential flotation of sulphide lead-zinc-iron ore, but tables were still in use to concentrate a small quantity of carbonate lead ore. During the year $240,985 was spent in development, consisting of 23,214 feet of drifting, raising, and sinking, and dividends of $1,337,710 were paid, making a total of $19,880,545 to the end of 1926. A dividend of $304,025 was declared payable on January 3, 1927. The report says:

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[13] Silver King Coalition Mines Co. Ann. Rept., for year ended Dec. 31, 1926.

> During the first quarter of the year 1926, metal prices were at a peak and advantage of these higher metal prices was taken by us in the marketing of increased tonnage of ores. After the first quarter of the year, metal prices declined and production was correspondingly restricted and operations confined, wherever practicable, to the smaller and low-grade ore bodies. This policy of conservation, together with the extensive development campaign carried on throughout the year, is reflected in decreased financial returns. * * *
>
> Labor conditions were satisfactory. Development work was carried on well in advance of ore production and revealed substantial reserves. Large additions were made to mill equipment and to underground facilities. Replacement and additions to buildings have been completed. The entire property is in an excellent state of efficiency and the available ore reserves are satisfactory in quantity and quality.

The Park Utah Consolidated Mines Co. operated the Park City unit, consisting of the Daly West and Daly Judge properties, and the Park Utah unit in the eastern part of the district. Ore from the Park Utah unit comprised first-class siliceous silver ore shipped for smelting and a large quantity of lead-zinc ore shipped to International for milling. The grade of lead and zinc in the mill product has increased considerably in recent years. The Daly Judge mill in Empire Canyon was operated, and the Park City unit produced first-class lead ore, lead concentrate, and a zinc-iron middling which was shipped to a custom mill for further treatment. Early in the year a new aerial tramway, which has a capacity of 1,000 tons of ore a day, was completed from the mines and mill in Empire Canyon to the lower terminal at Park City.

According to the annual report of the Park Utah Consolidated Mines Co. for 1926, the combined output of all mines, including the Ontario and Daly properties, amounted to 336,821 tons of ore; ore and concentrates shipped contained 20,631 ounces of gold, 5,196,642 ounces of silver, 1,968,608 pounds of copper, 40,558,913 pounds of lead, and 40,515,107 pounds of zinc. Much of this zinc, contained in the lead ore and concentrate shipped direct to lead smelters and in ore shipped for milling, was lost. The bulk of the ore was milled, and the zinc recovered from the zinc concentrate was probably about 25,000,000 pounds. The total metal contents of the ore output of each mine follow:

Gold, silver, copper, lead, and zinc contained in ore and concentrates shipped from properties under control of Park Utah Consolidated Mines Co., Utah, in 1926

Mine	Ore and concentrates	Gold	Silver	Copper	Lead	Zinc	Value received per ton
	Short tons	*Ounces*	*Ounces*	*Pounds*	*Pounds*	*Pounds*	
Park Utah Consolidated	236, 316	20, 080	4, 237, 026	1, 759, 343	39, 149, 048	38, 535, 071	$18. 25
Ontario	22, 885	521	930, 774	199, 255	1, 312, 000	1, 980, 036	21. 07
Daly	421	30	28, 842	10, 010	97, 865		55. 73
	259, 622	20, 631	5, 196, 642	1, 968, 608	40, 558, 913	40, 515, 107	18. 56

The Park Utah Consolidated Mines Co., exclusive of the Ontario and Daly properties, was the largest producer of silver in Utah in 1926; it was second in the production of lead and of zinc and third in the production of gold. Dividends paid to stockholders in 1926 amounted to $1,256,100. The following paragraphs are taken from the company's annual report:

> At the Park Utah unit most of the development and exploratory work has been confined to determining the extent of the western ore body opened on the 1,800-foot level more than a year ago and to place it in condition to permit an increased rate of production. The result of this work has been most satisfactory. Not only have extensive tonnages of ore been proved, but additional data have been obtained concerning the direction and characteristics of the mineralization. * * *
>
> The western ore body has been developed on the 1,800 level for five hundred and fifty feet along the strike of the vein and further work is expected to determine additional extensions. On the 1,650-foot level the ore has been found to average thirty feet in width and has been followed for nine hundred feet along the strike of the vein. The western limit of the ore body has not been reached.
>
> Extraction of this deposit has just been started. Assays from development headings show that the ores on the lower levels contain a marked increase in gold, lead, and zinc content, but a decrease in silver as compared to the ores mined above the 1,500-foot level.
>
> The ore exposure in the 1,800-foot level shows no indication that the bottom of the deposit is in proximity. The knowledge that several years full production of ore is in sight above this level makes it inadvisable at the present time to dewater and block out the ore at a lower horizon. It is planned, instead, to prosecute exploratory work more vigorously for new ore bodies above this level.
>
> At the Park City unit further development has resulted in the finding of additional tonnages as a continuation of the Middle and Daly vein ore bodies. The 300-foot level ore body of the Daly West mine has also been a large producer. The Park City unit produced 149,056 tons of ore, a slight increase over its 1925 record year. The ore reserves and the permanence of its mineral bearing veins give assurance that this unit of the property will continue its heavy production and large earning capacity. * * *
>
> At the date of this report the main underground hoist installation is nearing completion. * * * The hoist is located near the western ore body at the 1,500-foot level and will hoist at the rate of eighty tons per hour from a 1,000-foot depth.

The Park Utah Consolidated Mines Co. received $4,427,242 from the sale of ore and from other income, paid out $2,873,647 for various expenses (including taxes and depreciation), and had a net income for the year of $1,553,595.

The Daly Mining Co., which is a separate incorporation but controlled and operated by the Park Utah Consolidated Mines Co., shipped 421 tons of oxidized silver-lead ore which was smelted at International. (See p. 505.)

The Ontario Silver Mining Co., controlled by the same interests as the Park Utah Consolidated Mines Co., shipped 22,885 tons of low-grade lead-zinc milling ore and old tailings to International. (See p. 505.) In spite of the fact that this mine was said to be exhausted several years ago it made the unusual record of producing ore containing more than 900,000 ounces of silver in addition to being a large producer of lead and zinc. Most of the ore was milled at a custom flotation plant, but part of it was used as converter lining.

The property of the Keystone Mining Co., near the Silver King Coalition mine, was operated only six months in 1926, but dividends amounting to $67,500 were paid. The mine is opened by a 400-foot shaft and a 4,500-foot tunnel; 953 feet of work was done in 1926. The property is equipped with a 150-ton gravity-concentration mill which produced lead concentrate and a zinc-iron middling; the latter was re-treated at Midvale.

More than 1,600 feet of drifting was done by the Silver King Consolidated Mining Co. on property west of the Silver King Coalition mine, but no ore was shipped.

Several lots of oxidized lead ore were shipped from the Kennelly group, on the border line of Summit and Salt Lake Counties.

The Glencoe property, an old mine in the Blue Ledge district near Keetley, was operated in 1926 by the Park Galena Mining Co. Several hundred tons of lead-zinc-iron ore were shipped to the custom flotation plant at Midvale. Work, started in September, consisted largely of stoping and cleaning out the old drifts. The property is opened by a 400-foot vertical shaft and a 2,000-foot tunnel. Ore in reserve is said to average 11 ounces of silver to the ton, 8 per cent of lead, and more than 7 per cent of zinc. Old tailings containing silver, lead, and zinc, lodged in the creeks below the mills at Park City, were treated locally.

The Charles Moore plant in Woodman Gulch below the mill of the Silver King Coalition Mines Co. produced both lead concentrate and zinc concentrate; similar concentrates were shipped from the Clegg & Blake and Beggs plants, and highly siliceous tailings were shipped to smelters to be used as converter lining.

TOOELE COUNTY

In Tooele County 41 mines produced a total of 40,537 tons of ore; the output was 35,022 tons less than that reported from 46 mines in 1925. The recovered gold increased from $36,317 to $51,242 and the zinc from 1,164,551 to 2,368,563 pounds; the silver decreased from 516,901 to 204,749 fine ounces, the copper from 1,037,047 to 179,780 pounds, and the lead from 13,288,081 to 11,071,103 pounds. The total value of all metals decreased from $1,786,876 to $1,267,504. The decreases in silver, copper, and lead were due to the idleness of the mill of the Ophir Hill Consolidated Mining Co. at Ophir.

At International, west of Bingham, the International Smelting Co., subsidiary of the Anaconda Copper Mining Co., operated its 1,000-ton flotation plant and its copper and lead smelting plants on custom ore. The copper plant is equipped with roasters, Cottrell plant, 5 reverberatory furnaces, and 5 converters. The lead plant has 10 Dwight-Lloyd sintering machines and 5 blast furnaces. In August 4 lead blast furnaces and 1 of the copper reverberatories were in use. The following paragraphs are taken from the report of the Anaconda Copper Mining Co. for 1926:

> The concentrating plant at International, Utah, treated 343,126 tons of ore, from which there were produced 122,884 tons of concentrates, of which 38,416 tons were zinc concentrates shipped to the electrolytic zinc plant at Great Falls, Mont.
>
> The copper plant treated 88,593 tons of ore and concentrates, from which there were produced 19,202,538 pounds of fine copper, 1,691,232 ounces of silver, and 16,100.44 ounces of gold.
>
> The lead plant treated 285,294 tons of ore and concentrates, from which there were produced 135,658,034 pounds of lead, 7,032,273 ounces of silver, and 21,867.84 ounces of gold. From the treatment of fume and flue dust there were obtained 716 tons of crude arsenic, averaging 92.93 per cent As_2O_3.

From 1917 to 1926 the smelting plants treated 1,224,208 tons of copper material and 2,089,854 tons of lead material, from which

263,059 ounces of gold, 53,417,254 ounces of silver, 174,275,605 pounds of copper, and 671,844,576 pounds of lead were recovered, largely from Utah ores. The totals, by years, from 1916 to 1925, are given in the Mines Handbook.[14] The flotation plant at International was fully described by Page.[15]

Clifton district (*Gold Hill*).—Thirteen mines in the Clifton district produced 1,382 tons of ore, yielding $23,351 in gold, 13,772 ounces of silver, 13,826 pounds of copper, 267,083 pounds of lead, and 2,243 pounds of zinc, valued in all at $55,416, or $40.10 in metals a ton. Nearly all the ore was a first-class smelting product, consisting chiefly of lead ore but including some gold ore. Several cars of rich gold ore were shipped from the Rube group which is opened by a shaft 147 feet deep and 400 feet of drifts. The Western Utah property, a large producer of arsenic ore in the past, was practically idle in 1926, but early in the year several cars of oxidized lead ore were shipped for smelting. Producers worthy of note were the Garrison Monster, Engineer Development Co., Monoca, and the Gold Hill property of the United States Smelting, Refining & Mining Co. Ore in small lots was also shipped from the Cash Boy, New Baltimore, Lucy L., Red Bird, Southern Confederate, Success, and Mineral Hill claims.

Columbia district.—Several cars of oxidized lead ore were shipped from the Sharp mine, in Harker Canyon, and two cars from the Hill Top property, where 500 feet of development was done.

Dugway district.—The Yellow Jacket and Dugway properties produced several cars of first-class lead ore; lessees shipped sulphide lead-zinc ore from the Four Metals mine.

Erickson district.—The property of the Imperial Lead Mining Co. was worked on a part-time basis, and several cars of crude lead ore and concentrate were shipped to Murray for smelting. A test lot of lead ore was shipped from Lucerne by the Glenn Springs Mining Co., and considerable development was done at the Utah Majestic property.

Granite Mountains district.—The National Copper Mining Co., whose property is opened by three tunnels, the longest of which is 950 feet, shipped about 20 tons of sulphide lead ore which were hauled to the smelter by trucks.

Lakeside district.—The Monarch mine in the Lakeside Range southwest of Great Salt Lake produced one car of lead ore which was hauled 18 miles to Delle on the Western Pacific Railroad. Some development was done at the Lead Prince property.

North Tintic district.—A little lead-zinc ore from the New Bullion property was shipped to a zinc plant in the East; lead ore from the Scranton mine, a large producer of zinc in the past, was shipped to the lead smelter at Midvale.

Ophir district.—Six mines in the Ophir district produced 1,437 tons of ore, which yielded $518 in gold, 13,802 ounces of silver, 38,553 pounds of copper, 434,006 pounds of lead, and 369,664 pounds of zinc, valued in all at $76,973, or $53.57 in metals a ton. The marked decrease in the value of the district output, from $870,879 in 1925, was due to curtailment at the Ophir Hill property. This property,

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[14] Neale, W. G., The Mines Handbook, vol. 17, p. 94.

[15] Page, W. C., "Treatment of lead-zinc ores at International, Utah": Salt Lake Min. Review, vol. 28, May 15, 1926, p. 14.

a large producer of lead concentrate from 1890 to 1925, and especially since 1912, was practically unproductive in 1926, as only a small quantity of lead-zinc ore was shipped to the plant of the Combined Metals Reduction Co. at Bauer for testing. The lead concentrate marketed from the property in the past contained considerable zinc which was penalized; the property would probably have been a large zinc producer if some means of cheaply separating the sphalerite had then been known. The ore body, as known on the north side of the canyon, was worked out, but the company was doing active development in 1926 to prospect for the faulted segment of the ore body on the south side of the canyon. In December a three-compartment shaft had been sunk 700 feet and it was planned to sink to a depth of 1,200 feet. Several hundred tons of oxidized lead ore were shipped from the Hidden Treasure mine, and considerable lead-zinc ore for separation at a custom plant; about 700 feet of prospecting was done in drifts and tunnels. Other producers were the Queen of the Hills, Kearsarge, and Buffalo properties.

Rush Valley district (*Stockton*).—Nine mines in the Rush Valley district produced 36,584 tons of ore, which yielded $27,119 in gold, 174,667 ounces of silver, 126,081 pounds of copper, 10,044,955 pounds of lead, and 1,962,198 pounds of zinc, valued in all at $1,104,523, or $30.19 in metals a ton. The district output comprised 21,797 tons of ore shipped for smelting, and 14,787 tons of milling ore which yielded 4,782 tons of concentrate containing gold, silver, copper, lead, and zinc. The Honorine mine, a large producer of silver-lead ore in the past, is controlled and operated by the Combined Metals Reduction Co.; it has become a large producer of first-class lead ore and lead-zinc mill ore. About 1,800 feet of development was accomplished during 1926, a large quantity of oxidized lead ore was shipped to International for smelting, and considerable ore was separated into lead and zinc products at the flotation plant at Bauer. This mill, used primarily for treating ore from the Combined Metals mine at Pioche, Nev., has been in successful operation for three years; the plant was described in March.[16] The section designed to reduce lead concentrate to metallic lead was not operated on a commercial basis in 1926, and all the lead concentrate was shipped to International, whereas the zinc product went to Great Falls, Mont., and to plants in Texas and Oklahoma. The output of the flotation plant was given and the problems of the leaching plant were described in October.[17]

The Tip Top and Cyclone claims, worked by the Stockton Lead Co., produced 6,600 tons of sulphide lead ore containing about 36,000 ounces of silver and 2,350,000 pounds of lead. The company has no milling plant, and all the ore was hauled by team 1½ miles to Stockton and thence to International. To facilitate transportation an effort is being made to connect the workings with the Honorine tunnel. The property is opened by a shaft 700 feet deep, from which level a winze is sunk. All development is said to be in ore. Several hundred tons of lead ore were shipped from the Galena King property. Other producers of small lots of ore were the Ben Harrison, Salvation-Hercules, Virginia, and Legal Tender properties.

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[16] Robie, E. H., "Selective flotation at Bauer, Utah": Eng. and Min. Jour.-Press, vol. 121, Mar. 6, 1926, p. 405.

[17] Martin, Gail, "Flotation and leaching plant of the Combined Metals Reduction Co.": Eng. and Min. Jour., vol. 122, Oct. 2, 1926, p. 542.

Silver Islet district.—A small lot of lead ore containing silver was produced from the Utah Silver Lake property and hauled by truck to the Midvale smelter.

UTAH COUNTY

American Fork district.—Seven lode mines in the American Fork district produced 3,466 tons of ore and old slag, yielding $28,518 in gold, 17,455 ounces of silver, 69,794 pounds of copper, 337,619 pounds of lead, and 73,204 pounds of zinc, valued in all at $81,681, or $23.57 in metals a ton. The first-class smelting ore was chiefly copper ore containing considerable gold; nearly all the milling ore contained principally silver and lead. The most valuable product of the district was sulphide copper ore, containing more than an ounce of gold to the ton, shipped from the Live Yankee mine of the Yankee Mines Co. Nearly 600 feet of work in drifts and raises was done by this company to develop ore that contains quartz, pyrite, and chalcopyrite; the conspicuous mineral is fairly clean chalcopyrite. The Pacific Gold Mining & Milling Co. treated about 2,000 tons of lead ore in a mill equipped for gravity concentration. A statement of November 1 to stockholders says:

> The mill was repaired and renovated, including cost of machinery and equipment, for $4,830. It was operated from the 28th day of June until the 23d day of September. * * *
>
> The company received from the sale of concentrates the sum of $20,273 for 223 dry tons. * * *
>
> Exploration and development work of the mine was continued; * * * a total of 599 feet has been accomplished since the 8th of February.

The lead concentrate was hauled 20 miles to the smelter at Murray. The company did 600 feet of development in drifting and raising. Several cars of lead-zinc ore for milling were shipped by the Globe Consolidated Mining Co. The Dutchman mine produced several lots of oxidized lead ore and also a little zinc ore that was shipped to Bartlesville, Okla. A small lot of silver-lead ore was shipped from the Milkmaid property.

Mine production of gold, silver, copper, lead, and zinc in American Fork district, Utah, 1925 and 1926, and total, 1870–1926

Year	Mines producing	Ore and slag	Gold	Silver	Copper	Lead	Zinc	Total value
		Short tons		*Fine ounces*	*Pounds*	*Pounds*	*Pounds*	
1925	6	[1] 3,374	$66,236	27,565	234,495	339,433		$148,195
1926	7	[2] 3,466	28,518	17,455	69,794	337,619	73,204	81,681
Total, 1870–1926		87,712	420,972	2,001,590	747,276	31,350,022	313,926	4,445,368

[1] Includes 58 tons of slag.

[2] Includes 3 tons of slag.

Santaquin district.—One car of sulphide silver-lead ore was shipped from the Union Chief mine.

Tintic district.—The following mines, which are in Utah County, in the eastern part of the Tintic district, are mentioned in the general review under Juab County: Tintic Standard, Mountain View, Yankee Consolidated, Zuma, Colorado Consolidated, Eureka Lily, Iron King, and Apex Standard. Considerable development was done near Dividend, notably at the Eureka Standard and Silver Shield properties.

GOLD, SILVER, COPPER, LEAD, AND ZINC IN NEVADA

(MINE REPORT)

By C. N. Gerry [1]

SUMMARY

In 1926 the total value of the mine production of gold, silver, copper, lead, and zinc in Nevada increased 5 per cent over 1925, due entirely to the increased output of copper, as the other metals declined in both quantity and value. The largest decrease was in silver; the decreases in lead and zinc, however, were considerable. Three mining companies published or reported to the Bureau of Mines dividends that amounted to $2,610,389, paid in 1926.

The value of the metal output of White Pine County was nearly $14,300,000, more than that of all other counties combined, on account of the large production of copper ore from mines at Ely, where the output was decidedly increased over 1925. Three other counties—Storey, Nye, and Lincoln—each produced metals worth more than $1,000,000, and Elko, Lander, and Lyon Counties followed closely. The large increase of nearly $3,000,000 from the copper regions of White Pine and Lyon Counties was in large part offset by marked decreases in metals from Nye and Clark Counties.

The total value of the mine production of gold, silver, copper, lead, and zinc in Nevada for the years 1904 to 1926, as recorded in Mineral Resources of the United States, has been $630,476,661. Details of production are as follows: Ore, old tailings, etc., 82,027,318 short tons; gold, $199,098,502; silver, 230,194,571 fine ounces; copper, 1,319,308,598 pounds; lead, 323,177,616 pounds; and zinc, 225,911,756 pounds.

The prices given in the table that follows are those at which the values for metals in this report have been calculated. The silver prices for 1917 and 1919 are dealers' buying price, New York; for 1918, average price as stated by the Bureau of the Mint; for 1920 to 1922, New York market price for domestic silver only; for 1923, average price under the Pittman Act, from January 1 to June 2, for domestic silver, and average New York price for all silver after that period; for 1924 and later years, average New York price for bar silver. The copper, lead, and zinc prices are weighted averages, for each year, of all grades of primary metal sold by producers.

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[1] The valuable assistance of B. N. Lowry and Paul Luff, of the Bureau of Mines, is acknowledged.

Prices of silver, copper, lead, and zinc, 1917–1926

Year	Silver	Copper	Lead	Zinc	Year	Silver	Copper	Lead	Zinc
	Per fine ounce	*Per pound*	*Per pound*	*Per pound*		*Per fine ounce*	*Per pound*	*Per pound*	*Per pound*
1917	$0. 824	$0. 273	$0. 086	$0. 102	1922	$1. 00	$0. 135	$0. 055	$0. 057
1918	1. 00	. 247	. 071	. 091	1923	. 82	. 147	. 070	. 068
1919	1. 12	. 186	. 053	. 073	1924	. 67	. 131	. 080	. 065
1920	1. 09	. 184	. 080	. 081	1925	. 694	. 142	. 087	. 076
1921	1. 00	. 129	. 045	. 050	1926	. 624	. 140	. 080	. 075

Mine production of gold, silver, copper, lead, and zinc in Nevada, 1917–1926

Year	Mines producing		Ore, old tailings, etc. (short tons)	Gold		Silver	
	Lode	Placer		Fine ounces	Value	Fine ounces	Value
1917	852	91	6, 473, 519	336, 664. 26	$6, 959, 468	11, 269, 969	$9, 286, 454
1918	660	54	6, 472, 579	320, 239. 45	6, 619, 937	10, 000, 599	10, 000, 599
1919	384	37	3, 187, 831	219, 695. 16	4, 541, 502	6, 863, 580	7, 687, 210
1920	434	39	3, 480, 620	172, 540. 46	3, 566, 728	7, 745, 093	8, 442, 151
1921	370	61	1, 096, 138	160, 254. 62	3, 312, 757	7, 083, 782	7, 083, 782
1922	345	42	1, 565, 276	159, 510. 95	3, 297, 384	8, 619, 587	8, 619, 587
1923	354	35	4, 354, 937	204, 292. 89	4, 223, 109	10, 614, 564	8, 703, 942
1924	348	36	4, 699, 333	217, 962. 56	4, 505, 686	9, 411, 379	6, 305, 624
1925	399	25	4, 927, 139	187, 104. 72	3, 867, 798	7, 096, 618	4, 925, 053
1926	377	28	5, 884, 568	175, 381. 68	3, 625, 461	6, 518, 983	4, 067, 845

Year	Copper		Lead		Zinc		Total value
	Pounds	Value	Pounds	Value	Pounds	Value	
1917	122, 794, 704	$33, 522, 954	27, 677, 928	$2, 380, 302	22, 307, 868	$2, 275, 402	$54, 424, 580
1918	116, 316, 441	28, 730, 161	23, 316, 534	1, 655, 474	16, 724, 753	1, 521, 953	48, 528, 124
1919	52, 331, 175	9, 733, 599	15, 349, 370	813, 517	9, 004, 698	657, 343	23, 433, 171
1920	50, 559, 763	9, 302, 996	21, 263, 700	1, 701, 096	10, 698, 040	866, 541	23, 879, 512
1921	10, 961, 491	1, 414, 032	7, 188, 768	323, 495	69, 397	3, 470	12, 137, 536
1922	23, 133, 091	3, 122, 967	9, 389, 182	516, 405	2, 618, 710	149, 266	15, 705, 609
1923	67, 204, 282	9, 879, 029	18, 156, 337	1, 270, 944	14, 166, 550	963, 325	25, 040, 349
1924	73, 805, 323	9, 668, 497	20, 060, 041	1, 604, 803	11, 002, 910	715, 189	22, 799, 799
1925	79, 300, 224	11, 260, 632	24, 476, 452	2, 129, 451	14, 821, 293	1, 126, 418	23, 309, 352
1926	101, 827, 937	14, 255, 911	22, 367, 965	1, 789, 437	10, 817, 833	811, 337	24, 549, 991

Gold and silver produced at placer mines in Nevada, 1917–1926

Year	Gold		Silver	
	Fine ounces	Value	Fine ounces	Value
1917	14, 153. 75	$292, 584	6, 278	$5, 173
1918	10, 564. 13	218, 380	3, 907	3, 907
1919	6, 399. 43	132, 288	2, 374	2, 659
1920	7, 383. 91	152, 639	3, 296	3, 593
1921	17, 566. 99	363, 142	7, 956	7, 956
1922	11, 602. 36	239, 842	4, 710	4, 710
1923	3, 941. 83	81, 485	1, 783	1, 462
1924	1, 323. 97	27, 369	546	366
1925	2, 536. 54	52, 435	1, 285	892
1926	2, 866. 17	59, 249	1, 494	932

GOLD

The value of the mine production of gold in Nevada decreased from $3,867,798 in 1925 to $3,625,461 in 1926, the smallest production in the last 20 years, with the exception of 1920, 1921, and 1922. Ore was treated by amalgamation in 15 counties and ore and old tailings were treated by cyanidation in 14 counties in 1926. By these two methods of treatment $2,448,004 in gold were recovered from 744,900 tons of ore and 4,060 tons of old tailings. Most of the placer gold in 1926 was obtained by hydraulic and drift mining in the Round Mountain and Manhattan districts, Nye County, and by rocker and hydraulic mining in the Battle Mountain district, Lander County. Amalgamation and cyanidation mills yielded more than 67 per cent of the total gold, concentrates more than 22 per cent, and crude smelting ore 8 per cent.

Seven properties supplied 73 per cent of the total gold in 1926, and each of these produced more than 6,000 ounces. The Comstock Merger in the Comstock district was first, followed by the Nevada Consolidated at Ely, the Elkoro and the United Eastern at Jarbidge, the Flowery at Virginia City, the Round Mountain Mining Co. at Round Mountain, and the Tonopah Belmont at Tonopah.

SILVER

In 1926 the mine production of silver was decidedly less than the yearly average of the decade 1917 to 1926, which was about 8,522,000 ounces. The quantity decreased 8 per cent in 1926, due in large part to the marked decrease in the Tonopah district. The decrease in total value was more than 17 per cent, as the average price of silver decreased from 69.4 cents an ounce in 1925 to 62.4 cents in 1926. The largest decreases were in Nye, Washoe, Pershing, Churchill, and Clark Counties. In Nye County 1,868,354 ounces of silver were contained in bullion recovered at amalgamation or cyanidation mills; most of this silver, or 1,864,523 ounces, was recovered by cyanidation, largely from ores treated in the eastern part of the Tonopah district in Nye County. In the Comstock district, Storey County, the output of silver was 1,534,116 ounces, most of which was recovered by cyanidation. Other districts that were important producers of silver in 1926 were the Lewis and Cortez districts (in Lander County), the Divide district (in Esmeralda County), and the Pioche district (in Lincoln County). Concentrates yielded 1,478,537 ounces of silver, as against 1,317,299 ounces in 1925. Lead concentrates yielded 1,223,988 ounces of silver, an average recovery of 96.03 ounces per ton, as against 1,084,764 ounces, an average of 62.27 ounces, in 1925.

Eight properties yielded 75 per cent of the total silver in 1926. These properties, in order of production, were the Comstock Merger, in the Comstock district; the Betty O'Neal, near Battle Mountain; the Tonopah Belmont, Tonopah Extension, and Tonopah Mining, all at Tonopah; the Consolidated Cortez, at Cortez; the West End Consolidated, at Tonopah; and the Tonopah Divide, at Divide, Esmeralda County.

COPPER

In 1926 the mine production of copper in Nevada increased more than 28 per cent in quantity and nearly $3,000,000, or 27 per cent, in value. Concentrates yielded 92 per cent of the total copper, and crude ore shipped to smelters yielded nearly 8 per cent. The Nevada Consolidated Copper Co. at Ely, White Pine County, increased its output decidedly, producing copper at an average of approximately 7,400,000 pounds a month. Shipments of first-class ore and mill ore were made in August from the property of the Consolidated Coppermines to the smelter of the Nevada Consolidated Copper Co. at McGill. An interesting feature of the year, which increased the output of copper, was the resumption of work at the mine, mill, and smelter of the Mason Valley Mines Co. in Lyon County. The smelter at Thompson was blown in in August after being idle since 1919.

LEAD

The mine production of lead in Nevada in 1926 decreased nearly 9 per cent in quantity; it was larger, however, than the average yearly output for the decade 1917 to 1926, which was about 18,900,000 pounds. About 43 per cent of the lead was derived from concentrates of milling ore and old tailings and 55 per cent from crude ore shipped directly to smelters. Lead concentrates (carbonates and sulphides) shipped to smelters yielded 9,218,671 pounds of lead, an average of 36.16 per cent, as against 9,107,258 pounds, or 26.14 per cent, in 1925. The total crude ore of shipping grade yielded 12,348,201 pounds of lead, compared to 13,008,611 pounds in 1925. Oxidized lead ore shipped to smelters yielded 6,418,501 pounds of lead, and sulphide ore 3,483,017 pounds, as against 8,399,758 pounds and 2,392,124 pounds, respectively, in 1925. First-class oxidized copper-lead ore yielded 1,273,912 pounds of lead, and sulphide ore 11,305 pounds. The lead-zinc ore of smelting grade (all of which was oxidized ore) yielded 359,235 pounds of lead, and zinc ore (nearly all of which was oxidized) 14,470 pounds. The dry and siliceous ore of smelting grade yielded 786,344 pounds of lead.

Nearly 68 per cent of the lead came from 10 mines. The Combined Metals, at Pioche, Lincoln County, was the largest producer, followed by the Eureka-Holly and Richmond-Eureka in Eureka County, the Simon Silver-Lead in Mineral County, the Bristol Silver in Lincoln County, the Spruce Monarch and Black Forest in Elko County, the Quartz Mountain in Nye County, the Goodsprings Anchor in Clark County, and the Prince Consolidated in Lincoln County.

ZINC

In 1926 the mine production of zinc in Nevada decreased 27 per cent in quantity, due largely to the great decrease in production from the property of the Yellow Pine Mining Co. in Clark County.

The Pioche district, Lincoln County, produced nearly 70 per cent of the total zinc output of the State and was followed by the Yellow Pine district in Clark County, which was for years the largest zinc-producing district in the State. The Bell district, in Mineral County, also produced a large quantity of zinc.

Sulphide zinc-lead ore from Pioche was treated by flotation in the plant of the Combined Metals Reduction Co. at Bauer, Utah. The resulting lead concentrate was shipped to International, Utah, and the zinc product to the electrolytic zinc plant near Great Falls, Mont., and to other zinc plants in the West. The Yellow Pine Mining Co. at Goodsprings shipped carbonate ore to eastern zinc plants. The Simon Silver-Lead Mines (Inc.) at Simon, Mineral County, shipped both zinc concentrate and lead concentrate; the mill was run only five months.

Mine production of gold, silver, copper, lead, and zinc in Nevada, 1925 and 1926, by counties

1925

County	Ore, old tailings, etc. (short tons)	Gold					Silver (lode and placer)	
		Lode		Placer		Total value	Fine ounces	Value
		Fine ounces	Value	Fine ounces	Value			
Churchill	1,445	123.45	$2,552			$2,552	67,204	$46,640
Clark	24,036	3,867.48	79,948			79,948	78,418	54,422
Douglas	12	18.91	391	1.60	$33	424	9	6
Elko	67,294	26,747.31	552,916			552,916	144,846	100,523
Esmeralda	12,014	8,582.93	177,425			177,425	124,680	86,528
Eureka	31,050	1,627.77	33,649	78.95	1,632	35,281	101,843	70,679
Humboldt	472	423.23	8,749	3.53	73	8,822	9,945	6,902
Lander	65,034	1,233.03	25,489	193.84	4,007	29,496	975,857	677,245
Lincoln	63,498	1,438.24	29,731			29,731	403,748	280,201
Lyon	3,124	713.10	14,741			14,741	5,877	4,079
Mineral	33,907	2,902.45	59,999			59,999	313,847	217,810
Nye	205,195	40,096.06	828,859	2,199.27	45,463	874,322	3,098,513	2,150,368
Ormsby	519	91.14	1,884			1,884	698	484
Pershing	9,253	1,743.78	36,047	41.84	865	36,912	71,978	49,953
Storey	474,325	57,902.26	1,196,946			1,196,946	1,350,156	937,008
Washoe	8,641	1,472.73	30,444			30,444	188,731	130,979
White Pine	3,927,320	35,584.31	735,593	17.51	362	735,955	160,268	111,226
	4,927,139	184,568.18	3,815,363	2,536.54	52,435	3,867,798	7,096,618	4,925,053

County	Copper		Lead		Zinc		Total value
	Pounds	Value	Pounds	Value	Pounds	Value	
Churchill	1,914	$272	919,626	$80,007			$129,471
Clark	22,610	3,211	5,409,440	470,621	6,230,664	$473,530	1,081,732
Douglas							430
Elko	176,887	25,118	3,103,846	270,034	23,781	1,807	950,398
Esmeralda	7,254	1,030	236,792	20,601	5,783	439	286,023
Eureka	25,955	3,686	4,331,011	376,798			486,444
Humboldt	36	5	2,560	223			15,952
Lander	80,090	11,373	334,302	29,084			747,198
Lincoln	229,034	32,523	6,418,524	558,412	8,049,995	611,800	1,512,667
Lyon	43,135	6,125					24,945
Mineral	13,282	1,886	740,007	64,381	255,000	19,380	363,456
Nye	6,624	941	698,965	60,810			3,086,441
Ormsby	750	106	300	26			2,500
Pershing	1,981	281	99,977	8,698			95,844
Storey	838	119					2,134,073
Washoe	36,295	5,154	549,187	47,779	30,286	2,302	216,658
White Pine	78,653,539	11,168,802	1,631,915	141,977	225,784	17,160	12,175,120
	79,300,224	11,260,632	24,476,452	2,129,451	14,821,293	1,126,418	23,309,352

Mine production of gold, silver, copper, lead, and zinc in Nevada, 1925 and 1926, by counties—Continued

1926

County	Ore, old tailings, etc. (short tons)	Gold					Silver (lode and placer)	
		Lode		Placer		Total value		
		Fine ounces	Value	Fine ounces	Value		Fine ounces	Value
Churchill	896	210.43	$4,350			$4,350	27,490	$17,154
Clark	13,025	3,275.86	67,718			67,718	39,121	24,412
Douglas	64	16.06	332	0.78	$16	348	1,640	1,023
Elko	64,725	25,145.23	519,798			519,798	194,235	121,203
Esmeralda	34,130	8,894.76	183,871			183,871	524,188	327,093
Eureka	34,968	3,906.62	80,757	14.66	303	81,060	155,425	96,985
Humboldt	413	90.75	1,876	35.75	739	2,615	7,749	4,835
Lander	75,349	2,515.07	51,991	254.74	5,266	57,257	1,125,572	702,357
Lincoln	69,096	1,019.07	21,066			21,066	427,345	266,663
Lyon	248,538	1,599.66	33,068			33,068	43,567	27,186
Mineral	40,410	1,748.61	36,147			36,147	287,696	179,522
Nye	138,784	29,199.92	603,616	2,470.85	51,077	654,693	1,941,406	1,211,437
Ormsby	1	1.31	27			27	2	1
Pershing	1,341	629.07	13,004	46.34	958	13,962	20,643	12,881
Storey	481,767	57,144.28	1,181,277			1,181,277	1,534,116	957,289
Washoe	560	701.53	14,502			14,502	21,818	13,615
White Pine	4,680,501	36,417.28	752,812	43.05	890	753,702	166,970	104,189
	5,884,568	172,515.51	3,566,212	2,866.17	59,249	3,625,461	6,518,983	4,067,845

County	Copper		Lead		Zinc		Total value
	Pounds	Value	Pounds	Value	Pounds	Value	
Churchill	1,453	$203	447,788	$35,823			$57,530
Clark	21,240	2,974	2,044,599	163,568	2,210,162	$165,762	424,434
Douglas	51	7	19,735	1,579			2,957
Elko	276,239	38,673	3,231,460	258,517	18,527	1,390	939,581
Esmeralda	3,115	436	70,834	5,667			517,067
Eureka	67,359	9,430	5,653,705	452,296	39,097	2,932	642,703
Humboldt	30	4	24,445	1,956			9,410
Lander	241,271	33,778	465,237	37,219	1,318	99	830,710
Lincoln	642,047	89,887	6,188,550	495,084	7,517,040	563,778	1,436,478
Lyon	5,457,347	764,029					824,283
Mineral	57,054	7,987	1,693,400	135,472	910,125	68,259	427,387
Nye	17,271	2,418	761,682	60,934			1,929,482
Ormsby							28
Pershing	4,245	594	215,995	17,280			44,717
Storey	3,390	475					2,139,041
Washoe	3,840	538	56,517	4,521	69,664	5,225	38,401
White Pine	95,031,985	13,304,478	1,494,018	119,521	51,900	3,892	14,285,782
	101,827,937	14,255,911	22,367,965	1,789,437	10,817,833	811,337	24,549,991

Ore, old tailings, etc., sold or treated, lode mines producing, and average value of ore, etc., in Nevada, 1925 and 1926, by counties

County	Ore, old tailings, etc. (short tons)		Lode mines producing		Average value per ton in all metals		Average value per ton in gold and silver	
	1925	1926	1925	1926	1925	1926	1925	1926
Churchill	1,445	896	9	8	$89.60	$64.21	$34.04	$24.00
Clark	24,036	13,025	35	36	45.00	32.59	5.59	7.07
Douglas	12	64	1	4	33.08	45.95	33.08	21.17
Elko	67,294	64,725	43	35	14.12	14.52	9.71	9.90
Esmeralda	12,014	34,130	38	37	23.81	15.15	21.97	14.97
Eureka	31,050	34,968	15	18	15.61	18.37	3.36	5.08
Humboldt	472	413	12	13	33.64	20.99	33.16	16.24
Lander	65,034	75,349	18	21	11.43	10.95	10.81	10.01
Lincoln	63,498	69,096	17	12	23.82	20.79	4.88	4.16
Lyon	3,124	248,538	14	14	7.98	3.32	6.02	.24
Mineral	33,907	40,410	35	41	10.72	10.58	8.19	5.34
Nye	205,195	138,784	57	51	14.82	13.53	14.51	13.07
Ormsby	519	1	3	1	4.82	28.00	4.56	28.00
Pershing	9,253	1,341	28	26	10.26	32.63	9.29	19.30
Storey	474,325	481,767	23	18	4.50	4.44	4.50	4.44
Washoe	8,641	560	19	13	25.07	68.57	18.68	50.21
White Pine	3,927,320	4,680,501	32	29	3.08	3.04	.22	.18
	4,927,139	5,884,568	399	377	4.71	4.15	1.77	1.30

Production of placer mines in Nevada, 1925 and 1926, by counties

County	1925					1926				
	Mines		Gold	Silver (fine ounces)	Total value	Mines		Gold	Silver (fine ounces)	Total value
	Hydraulic and sluicing	Drift				Hydraulic and sluicing	Drift			
Douglas	1	------	$33	--------	$33	1	------	$16	--------	$16
Eureka	2	------	1,632	5	1,635	1	------	303	1	304
Humboldt	1	------	73	1	74	4	------	739	7	743
Lander	7	------	4,007	31	4,029	6	2	5,266	36	5,288
Nye	8	2	45,463	1,236	46,321	7	2	51,077	1,430	51,969
Pershing	2	1	865	9	871	4	------	958	12	966
White Pine	1	------	362	3	364	1	------	890	8	895
	22	3	52,435	1,285	53,327	24	4	59,249	1,494	60,181

MINING INDUSTRY

In spite of the fact that the average metal prices were slightly lower than in 1925, an increase of more than $1,000,000 was recorded in the total metal output of Nevada in 1926. The improvement was due chiefly to increased copper production from Ely in White Pine County and to renewed activity at the copper property at Mason in Lyon County. In 1917 the metal output of Nevada was valued at more than $54,000,000, but it dwindled to about $12,000,000 in 1921, following the war period. A serious setback in the output of silver and gold has resulted from the large and regular decrease from the Tonopah district. In the Comstock district, Storey County, the output of gold and silver was unusually large from 1923 to 1926, but the mill of the Comstock Merger Mines (Inc.) was closed late in 1926, and a serious decrease in the output from the district for 1927 will result. The production of zinc has decreased decidedly from the Yellow Pine district in recent years, but the State output has been partly upheld by shipments from Pioche, Lincoln County, which have become increasingly important as a result of the successful treatment of the ore by flotation at Bauer, Utah. No scarcity of labor for the mines was reported; mills were being constructed at Midas, Battle Mountain, Hawthorne, and other camps.

The quantity of ore, old tailings, and slag sold or treated in Nevada in 1926 increased more than 19 per cent over 1925, but the average value in recovered metals a ton decreased from $4.71 to $4.15. Copper ore led in quantity, with 83 per cent of the total, and dry gold and silver ore and old tailings followed. Of the total ore, etc., 84 per cent was concentrated, 13 per cent was treated in gold and silver mills, and 3 per cent was shipped crude to smelters. Ore from mines in the Robinson district, White Pine County, chiefly from the property of the Nevada Consolidated Copper Co., constituted 79 per cent of the total ore, old tailings, and slag.

During the past 10 years (1917 to 1926) 81 per cent of the total yield of gold in Nevada was recovered from dry and siliceous ore, etc., 13 per cent from copper ore, and nearly 4 per cent from placers. Most of the silver, or nearly 87 per cent, was recovered from dry and siliceous ore, etc., and nearly 10 per cent from lead ore, etc. Practically all the copper, or 99 per cent, was recovered from copper ore. Fifty-six per cent of the lead was recovered from lead ore, etc., 23 per cent from zinc ore and lead-zinc ore, and 19 per cent from dry and siliceous ore, etc. All the zinc was recovered from zinc ore and lead-zinc ore.

Ore, old tailings, etc., sold or treated in Nevada, 1917–1926, with content in terms of recovered metals

DRY AND SILICEOUS ORE

Year	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
1917	1, 413, 929	268, 671. 85	10, 176, 717	69, 231	7, 193, 631	----------
1918	1, 394, 583	257, 063. 06	9, 152, 376	70, 634	5, 516, 226	----------
1919	783, 567	194, 008. 03	6, 306, 583	191, 763	5, 987, 127	----------
1920	799, 207	136, 058. 51	6, 939, 579	168, 534	5, 789, 125	----------
1921	667, 560	133, 294. 94	6, 539, 514	229, 989	1, 574, 307	----------
1922	871, 883	140, 506. 36	7, 809, 857	146, 038	922, 499	----------
1923	1, 371, 970	167, 194. 50	9, 084, 056	776, 393	4, 632, 914	----------
1924	1, 066, 479	181, 627. 55	8, 002, 859	303, 183	2, 438, 701	----------
1925	844, 948	140, 878. 25	5, 261, 402	51, 838	1, 016, 134	----------
1926	806, 518	126, 615. 10	4, 509, 178	51, 778	867, 426	----------
COPPER ORE						
1917	4, 945, 482	49, 419. 80	327, 751	[1] 122, 422, 830	20, 876	----------
1918	4, 994, 804	49, 186. 44	278, 615	116, 109, 020	69, 172	----------
1919	2, 363, 189	16, 254. 92	73, 371	52, 042, 089	6, 471	----------
1920	2, 616, 237	22, 924. 19	82, 977	49, 858, 120	4, 871	----------
1921	401, 153	4, 747. 21	19, 323	10, 318, 851	21	----------
1922	629, 408	4, 400. 63	17, 127	[1] 22, 640, 042	424	----------
1923	2, 833, 908	29, 551. 13	84, 568	66, 089, 635	2, 697	----------
1924	3, 505, 301	32, 314. 93	106, 614	[1] 73, 325, 336	----------	----------
1925	3, 923, 158	35, 515. 84	125, 477	[1] 78, 795, 059	----------	----------
1926	4, 888, 681	36, 408. 95	142, 316	[1] 100, 870, 898	1, 417	----------
LEAD ORE						
1917	66, 614	3, 939. 81	556, 706	172, 265	15, 355, 354	----------
1918	48, 169	2, 311. 40	429, 917	69, 838	12, 972, 922	----------
1919	19, 152	2, 481. 11	373, 518	71, 862	6, 121, 663	----------
1920	40, 544	3, 237. 01	520, 971	158, 364	11, 111, 973	----------
1921	25, 597	4, 614. 98	496, 826	384, 739	5, 415, 434	----------
1922	39, 462	2, 979. 85	698, 590	331, 168	6, 266, 647	----------
1923	84, 764	2, 571. 61	1, 238, 842	300, 625	8, 352, 022	----------
1924	81, 202	1, 995. 82	1, 093, 429	154, 363	10, 314, 895	----------
1925	94, 769	6, 882. 73	1, 361, 753	351, 494	16, 131, 583	----------
1926	111, 265	8, 538. 16	1, 395, 285	252, 687	14, 254, 647	----------
COPPER-LEAD ORE						
1917	1, 158	263. 74	21, 967	127, 459	265, 113	----------
1918	800	929. 14	12, 218	63, 410	241, 583	----------
1919	4, 996	511. 52	3, 345	24, 871	92, 413	----------
1920	6, 269	2, 936. 41	114, 358	374, 745	1, 340, 286	----------
1921	1, 689	30. 50	20, 163	27, 912	154, 288	----------
1922	102	1. 90	2, 153	11, 283	39, 869	----------
1923	330	708. 16	13, 089	21, 769	60, 558	----------
1924	3	. 05	1, 786	489	893	----------
1925	125	4. 87	3, 259	11, 426	43, 851	----------
1926	10, 151	203. 51	147, 470	594, 800	1, 285, 217	----------
ZINC ORE AND LEAD-ZINC ORE						
1917	46, 336	215. 31	180, 550	2, 919	4, 842, 954	22, 307, 868
1918	34, 223	185. 28	123, 566	3, 539	4, 516, 631	16, 724, 753
1919	16, 927	40. 15	104, 389	590	3, 141, 696	9, 004, 698
1920	18, 363	. 43	83, 912	----------	3, 017, 445	10, 698, 040
1921	139	----------	----------	----------	44, 718	69, 397
1922	24, 421	19. 85	87, 150	4, 560	2, 159, 743	2, 618, 710
1923	63, 965	325. 66	192, 226	15, 860	5, 108, 146	14, 166, 550
1924	46. 348	700. 24	206, 145	21, 952	7, 305, 552	11, 002, 910
1925	64, 139	1, 286. 49	343, 442	90, 407	7, 284, 884	14, 821, 293
1926	67, 953	749. 79	323, 240	57, 774	5, 959, 258	10, 817, 833

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[1] Includes copper saved from precipitates recovered from mine water.

Ore, old tailings, etc., sold or treated in Nevada, 1925 and 1926, with content in terms of recovered metals

1925

Source	Mines producing	Ore, old tailings, etc.		Gold		Silver	
		Short tons	Per cent	Fine ounces	Per cent	Fine ounces	Per cent
Dry gold ore	156	[1] 129,914	2.64	59,519.79	31.81	77,247	1.09
Dry gold and silver ore	17	[2] 424,077	8.61	46,224.28	24.70	1,352,855	19.06
Dry silver ore	69	[3] 290,957	5.90	35,134.18	18.78	3,831,300	53.99
Copper ore	16	3,923,158	79.62	35,515.84	18.98	125,477	1.77
Lead ore	148	[4] 94,769	1.92	6,882.73	3.68	1,361,753	19.19
Zinc ore	6	2,274	.05	21.06	.01	8,104	.11
Copper-lead ore	4	[5] 125	----------	4.87	----------	3,259	.05
Lead-zinc ore	14	61,865	1.26	1,265.43	.68	335,338	4.72
Total, lode mines	[6] 399	4,927,139	100.00	184,568.18	98.64	7,095,333	99.98
Total, placers	25	----------	----------	2,536.54	1.36	1,285	.08
	424	4,927,139	100.00	187,104.72	100.00	7,096,618	100.00

Source	Copper		Lead		Zinc	
	Pounds	Per cent	Pounds	Per cent	Pounds	Per cent
Dry gold ore	5,325	0.01	27,272	0.11	----------	----------
Dry gold and silver ore	1,082	----------	19	----------	----------	----------
Dry silver ore	45,431	.06	988,843	4.04	----------	----------
Copper ore	[7] 78,795,059	99.36	----------	----------	----------	----------
Lead ore	351,494	.44	16,131,583	65.91	----------	----------
Zinc ore	6,720	.01	76,243	.31	1,234,754	8.33
Copper-lead ore	11,426	.01	43.851	.18	----------	----------
Lead-zinc ore	83,687	.11	7,208,641	29.45	13,586,539	91.67
	79,300,224	100.00	24,476,452	100.00	14,821,293	100.00

1926

Source	Mines producing	Ore, old tailings, etc.		Gold		Silver	
		Short tons	Per cent	Fine ounces	Per cent	Fine ounces	Per cent
Dry gold ore	139	[8] 141,967	2.41	51,699.25	29.48	89,327	1.37
Dry gold and silver ore	18	[9] 433,749	7.37	50,090.77	28.56	1,569,164	24.07
Dry silver ore	56	[10] 230,802	3.92	24,825.08	14.15	2,850,687	43.73
Copper ore	15	4,888,681	83.08	36,408.95	20.76	142,316	2.18
Lead ore	149	[11] 111,265	1.89	8,538.16	4.87	1,395,285	21.41
Zinc ore	4	312	.01	----------	----------	627	.01
Copper-lead ore	6	10,151	.17	203.51	.12	147,470	2.26
Lead-zinc ore	22	67,641	1.15	749.79	.43	322,613	4.95
Total, lode mines	[6] 377	5,884,568	100.00	172,515.51	98.37	6,517,489	99.98
Total, placers	28	----------	----------	2,866.17	1.63	1,494	.02
	405	5,884,568	100.00	175,381.68	100.00	6,518,983	100.00

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[1] Includes 2,270 tons of old tailings cyanided and 500 tons of old tailings amalgamated.

[2] Includes 2,350 tons of old tailings concentrated and 150 tons of old tailings cyanided.

[3] Includes 380 tons of old tailings concentrated, 470 tons of old tailings cyanided, 42 tons of sweeps cyanided, and 8 tons of sweeps sold to a smelter.

[4] Includes 2,170 tons of old tailings concentrated and 3,994 tons of slag sold to a smelter.

[5] Includes 14 tons of matte sold to a smelter.

[6] A mine producing more than one class of ore is counted but once in arriving at total for all classes.

[7] Includes 476,540 pounds of copper saved from precipitates recovered from mine water, largely from leaching of ore in place.

[8] Includes 2,445 tons of old tailings cyanided and 855 tons of old tailings concentrated.

[9] Includes 6,000 tons of old tailings concentrated.

[10] Includes 30,000 tons of old tailings concentrated, 1,615 tons of old tailings cyanided, and 675 tons of old tailings sold to a smelter.

[11] Includes 300 tons of old tailings concentrated and 1,120 tons of slag sold to a smelter.

Ore, old tailings, etc., sold or treated in Nevada, 1925 and 1926, with content in terms of recovered metals—Continued

1926—Continued

Source	Copper		Lead		Zinc	
	Pounds	Per cent	Pounds	Per cent	Pounds	Per cent
Dry gold ore	6,263	0.01	2,186	0.01		
Dry gold and silver ore	3,853		989			
Dry silver ore	41,662	.04	864,251	3.86		
Copper ore	[12] 100,870,898	99.06	1,417	.01		
Lead ore	252,687	.25	14,254,647	63.73		
Zinc ore			14,470	.06	193,768	1.79
Copper-lead ore	594,800	.58	1,285,217	5.75		
Lead-zinc ore	57,774	.06	5,944,788	26.58	10,624,065	98.21
	101,827,937	100.00	22,367,965	100.00	10,817,833	100.00

[12] Includes 341,843 pounds of copper saved from precipitates recovered from mine water, largely from leaching of ore in place.

Value of metals from ore, old tailings, etc., sold or treated in Nevada in 1926, by kinds of ore

Kind of ore	Ore, old tailings, etc. (short tons)	Gold	Silver	Copper	Lead	Zinc	Total
Dry gold ore	141,967	$1,068,718	$55,740	$877	$175		$1,125,510
Dry gold and silver ore	433,749	1,035,468	979,158	539	79		2,015,244
Dry silver ore	230,802	513,180	1,778,829	5,833	69,140		2,366,982
Copper ore	4,888,681	752,640	88,805	[1] 14,121,926	113		14,963,484
Lead ore	111,265	176,499	870,658	35,376	1,140,372		2,222,905
Zinc ore	312		391		1,158	$14,532	16,081
Copper-lead ore	10,151	4,207	92,021	83,272	102,817		282,317
Lead-zinc ore	67,641	15,500	201,311	8,088	475,583	796,805	1,497,287
	5,884,568	3,566,212	4,066,913	[1] 14,255,911	1,789,437	811,337	24,489,810
Total, 1925	4,927,139	3,815,363	4,924,161	[2] 11,260,632	2,129,451	1,126,418	23,256,025

[1] Includes value of 341,843 pounds of copper saved from precipitates recovered from mine water, largely from leaching of ore in place.

[2] Includes value of 476,540 pounds of copper saved from precipitates recovered from mine water, largely from leaching of ore in place.

GOLD ORE

The gold ore and old tailings, largely dry and siliceous, were reported from 139 mines in 1926, as compared with 156 in 1925, and yielded on the average $7.53 in gold and 0.63 ounce of silver to the ton; the average value was $7.93 in metals a ton. Nye County had the largest number of gold-ore producers—25—who reported 26,157 tons, mainly from the Round Mountain and Manhattan districts. Elko County, with only 11 producers of gold ore, had the greatest output—52,586 tons—nearly all of which came from the Jarbidge district; Storey County was second, with 50,233 tons. The largest producers of gold ore were the Flowery mine at Virginia City, the Elkoro mine at Jarbidge, the Round Mountain Mining Co. at Round Mountain, and the Bluster mine at Jarbidge. Gold ore from Gilbert (Desert district), Esmeralda County, was hauled to the custom cyanidation mill at Millers.

GOLD AND SILVER ORE

Gold and silver ore and old tailings, which increased slightly in 1926, were reported from 18 mines in 9 counties and yielded on the average $2.39 in gold and 3.62 ounces of silver to the ton. Five producers in Storey County reported the treatment of 431,534 tons of ore and old tailings, all from the Comstock district. The Comstock Merger Mines (Inc.) at Gold Hill treated nearly all the gold and silver ore and as a result was the largest producer of gold and silver in the State. Gold and silver ore was also shipped from Gilbert in Esmeralda County.

SILVER ORE

The output of siliceous silver ore and old tailings in 1926 was reported from 56 mines. The average yield from this material was $2.22 in gold and 12.35 ounces of silver to the ton, 0.01 per cent of copper, and 0.19 per cent of lead, or an average value of $10.26 in metals a ton. The Tonopah district, in Nye and Esmeralda Counties, was the largest producer of silver ore and was credited with 127,252 tons from 12 properties. There was, however, a marked decrease in the total output of silver ore, especially from Nye County, and consequently a large decrease in the quantity of gold and silver recovered therefrom. The largest producers of silver ore were the Tonopah Extension, at Tonopah; the Consolidated Cortez, at Cortez; and the Tonopah Belmont, Tonopah Mining, and West End Consolidated properties, all at Tonopah.

COPPER ORE

In 1926 there were 15 mines producing copper ore in Nevada. The ore, which increased nearly 25 per cent in quantity, yielded on the average 15 cents in gold and 0.03 ounce of silver to the ton and 1.03 per cent of copper; its average value was $3.05 in metals a ton. The Nevada Consolidated Copper Co. in the Robinson district, White Pine County, was the chief producer. A large quantity of copper ore was also produced from the property of the Mason Valley Mines Co. in the Yerington district, Lyon County, and from the property of the Consolidated Coppermines Co. in the Robinson district, White Pine County.

LEAD ORE

In 1926 lead ore, old tailings, and slag were produced in Nevada at 149 mines and prospects, as compared with 148 in 1925, and the output increased more than 17 per cent. The average yield of the ore and other material was $1.59 in gold and 12.54 ounces of silver to the ton, 0.11 per cent of copper, and 6.41 per cent of lead; the average value was $19.98 in metals a ton. The largest producers of lead ore were the Betty O'Neal mine near Battle Mountain, Lander County, and the Eureka-Holly mine in Eureka County.

COPPER-LEAD ORE

The output of copper-lead ore was reported from six mines in 1926 and yielded on the average 41 cents in gold and 14.53 ounces of silver to the ton, 2.93 per cent of copper, and 6.33 per cent of lead; the average value was $27.81 in metals a ton. Nearly all the copper-lead ore was produced at the Bristol Silver mine near Pioche, Lincoln County.

ZINC ORE

Three mines in the Yellow Pine district, Clark County, and one mine in the Eureka district, Eureka County, reported 312 tons of zinc ore, which yielded on the average 2.01 ounces of silver to the ton, 2.32 per cent of lead, and 31.05 per cent of zinc, and was valued at $51.54 in metals a ton. Most of the zinc ore came from the Potosi mine in Clark County.

LEAD-ZINC ORE

Lead-zinc ore was produced by 22 mines in 8 counties in 1926, and the output increased slightly over 1925. The Yellow Pine district, Clark County, had the greatest number of producers—12—but the largest output came from the Combined Metals mine at Pioche, Lincoln County, and from the Simon Silver-Lead property at Simon, Mineral County. The lead-zinc ore yielded on the average 23 cents in gold and 4.77 ounces of silver to the ton, 0.04 per cent of copper, 4.39 per cent of lead, and 7.85 per cent of zinc, and was valued at $22.14 in metals a ton.

Ore, old tailings, etc., sold or treated in Nevada, 1925 and 1926, by counties, with content in terms of recovered metals

1925

DRY GOLD ORE

County	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Churchill	1	19.03	11			
Clark	2,674	1,295.57	705	974	27,101	
Douglas	12	18.91	9			
Elko	56,063	26,648.04	33,987	10	10	
Esmeralda	[1] 4,841	7,701.57	6,470	4,156		
Eureka	41	91.03	30			
Humboldt	192	313.80	494			
Lander	645	434.06	735	71		
Lyon	[2] 2,246	690.19	4,235			
Mineral	419	914.63	878	20	38	
Nye	9,840	6,264.98	3,695		123	
Ormsby	[3] 500	90.30	221			
Pershing	510	999.33	1,204	46		
Storey	[4] 51,299	12,567.69	23,809	38		
Washoe	624	1,446.99	727			
White Pine	7	23.67	37	10		
	129,914	59,519.79	77,247	5,325	27,272	

DRY GOLD AND SILVER ORE

Elko	75	16.00	600			
Esmeralda	136	108.80	4,760			
Humboldt	140	106.68	3,959			
Mineral	209	188.32	7,231			
Nye	490	468.99	9,915	282		
Pershing	1	.90	43		19	
Storey	[5] 423,026	45,334.59	1,326,347	800		
	424,077	46,224.28	1,352,855	1,082	19	

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[1] Includes 170 tons of old tailings cyanided.
[2] Includes 1,952 tons of old tailings cyanided.
[3] Consists of old tailings amalgamated.
[4] Includes 148 tons of old tailings cyanided.
[5] Includes 2,350 tons of old tailings concentrated and 150 tons of old tailings cyanided.

Ore, old tailings, etc., sold or treated in Nevada, 1925 and 1926, by counties, with content in terms of recovered metals—Continued

1925—Continued

DRY SILVER ORE

County	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Churchill	13	4.68	907	----------	735	----------
Clark	20	7.16	2,914	86	1,858	----------
Elko	11	5.87	1,205	10	218	----------
Esmeralda	6,535	717.54	106,563	741	1,308	----------
Humboldt	123	2.05	4,640	36	----------	----------
Lander	40,304	669.44	365,024	2,227	31,757	----------
Lincoln	18,466	81.86	53,265	39,958	946,589	----------
Lyon	[6] 380	21.39	1,632	285	----------	----------
Mineral	23,238	251.84	191,167	895	1,703	----------
Nye	192,963	32,646.59	3,031,160	640	3,945	----------
Ormsby	16	.80	429	500	300	----------
Pershing	[7] 8,398	715.44	62,106	----------	100	----------
Washoe	2	1.82	329	----------	----------	----------
White Pine	[8] 488	7.70	9,959	53	330	----------
	290,957	35,134.18	3,831,300	45,431	988,843	----------

COPPER ORE

Elko	408	49.55	1,504	78,177	----------	----------
Lander	479	46.69	7,132	42,656	----------	----------
Lyon	498	1.50	10	42,850	----------	----------
Nye	12	5.00	720	1,500	----------	----------
Ormsby	3	.04	48	250	----------	----------
Washoe	24	3.00	81	2,858	----------	----------
White Pine	3,921,734	35,410.06	115,982	[9] 78,626,768	----------	----------
	3,923,158	35,515.84	125,477	78,795,059	----------	----------

LEAD ORE

Churchill	1,431	99.75	66,286	1,914	918,891	----------
Clark	[10] 6,872	2,553.94	52,415	15,230	3,210,397	----------
Elko	[11] 10,699	27.87	107,550	98,690	3,103,618	----------
Esmeralda	474	54.40	6,796	2,263	226,978	----------
Eureka	[12] 31,009	1,536.75	101,808	25,955	4,331,011	----------
Humboldt	17	.70	851	----------	2,560	----------
Lander	23,606	82.86	602,935	35,136	302,545	----------
Lincoln	5,074	208.95	62,761	111,197	902,992	----------
Mineral	1,041	1,438.09	96,556	9,344	258,622	----------
Nye	1,890	710.53	51,787	4,202	694,897	----------
Pershing	344	28.10	8,616	1,935	99,858	----------
Washoe	7,887	17.42	176,445	31,172	524,221	----------
White Pine	4,425	123.37	26,947	14,456	1,554,993	----------
	94,769	6,882.73	1,361,753	351,494	16,131,583	----------

ZINC ORE

Clark	1,506	10.80	6,210	6,320	38,700	930,480
Elko	38	----------	----------	----------	----------	23,781
Lincoln	467	10.26	1,808	----------	37,393	104,088
White Pine	263	----------	86	400	150	176,405
	2,274	21.06	8,104	6,720	76,243	1,234,754

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[6] Consists of old tailings concentrated.

[7] Includes 42 tons of sweeps cyanided and 8 tons of sweeps sold to a smelter.

[8] Includes 470 tons of old tailings cyanided.

[9] Includes 476,540 pounds of copper saved from precipitates recovered from mine water, largely from leaching of ore in place.

[10] Includes 2,170 tons of old tailings concentrated.

[11] Includes 3,941 tons of slag sold to a smelter.

[12] Includes 53 tons of slag sold to a smelter.

Ore, old tailings, etc., sold or treated in Nevada, 1925 and 1926, by counties, with content in terms of recovered metals—Continued

1925—Continued

LEAD-ZINC ORE

County	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Clark	12, 964	----------	16, 174	----------	2, 131, 384	5, 300, 184
Esmeralda	28	0. 60	91	94	8, 506	5, 783
Lincoln	39, 486	1, 137. 12	285, 575	77, 378	4, 530, 287	7, 945, 907
Mineral	9, 000	109. 59	18, 015	3, 023	479, 644	255, 000
Washoe	104	3. 48	11, 149	2, 265	24, 966	30, 286
White Pine	283	14. 64	4, 334	927	33, 854	49, 379
	61, 865	1, 265. 43	335, 338	83, 687	7, 208, 641	13, 586, 539

1926

DRY GOLD ORE

Churchill	103	127. 31	917	----------	----------	----------
Clark	1, 935	413. 22	1, 306	22	650	----------
Douglas	17	15. 00	8	----------	----------	----------
Elko	52, 586	25, 040. 71	53, 966	----------	----------	----------
Esmeralda	[13] 3, 809	5, 651. 42	5, 460	1, 425	358	----------
Eureka	1	10. 29	2	----------	----------	----------
Humboldt	115	70. 71	21	----------	----------	----------
Lander	1, 812	1, 578. 75	478	1, 480	1, 151	----------
Lincoln	1	2. 00	----------	----------	----------	----------
Lyon	[14] 3, 280	1, 201. 20	5, 255	----------	----------	----------
Mineral	[15] 1, 118	702. 93	953	2, 846	----------	----------
Nye	26, 157	7, 191. 45	9, 502	----------	27	----------
Ormsby	1	1. 32	2	----------	----------	----------
Pershing	529	562. 96	1, 564	402	----------	----------
Storey	[16] 50, 233	8, 450. 69	9, 645	88	----------	----------
Washoe	270	679. 29	248	----------	----------	----------
	141, 967	51, 699. 25	89, 327	6, 263	2, 186	----------

DRY GOLD AND SILVER ORE

Clark	1, 000	415. 63	14, 643	41	770	----------
Esmeralda	644	284. 02	9, 592	----------	----------	----------
Eureka	6	15. 51	314	----------	----------	----------
Humboldt	1	5. 44	191	----------	----------	----------
Mineral	265	141. 13	4, 749	294	----------	----------
Nye	278	515. 19	14, 448	147	----------	----------
Storey	[17] 431, 534	48, 693. 59	1, 524, 471	3, 302	----------	----------
Washoe	5	2. 16	93	----------	----------	----------
White Pine	16	18. 10	663	69	219	----------
	433, 749	50, 090. 77	1, 569, 164	3, 853	989	----------

DRY SILVER ORE

Churchill	2	1. 36	445	16	152	----------
Clark	2	7. 55	713	81	114	----------
Elko	5	3. 28	661	15	350	----------
Esmeralda	29, 448	2, 913. 18	505, 020	200	1, 557	----------
Humboldt	251	8. 26	5, 165	----------	----------	----------
Lander	44, 569	773. 98	343, 145	2, 307	33, 716	----------
Lincoln	[18] 15, 042	150. 77	47, 263	24, 052	825, 398	----------
Lyon	[19] 30, 000	386. 44	26, 641	7, 100	----------	----------
Mineral	639	152. 14	42, 295	5, 749	302	----------
Nye	109, 132	20, 380. 76	1, 866, 961	1, 757	2, 080	----------
Pershing	[20] 263	33. 89	5, 164	191	582	----------
Washoe	9	12. 00	1, 295	194	----------	----------
White Pine	[21] 1, 440	1. 47	5,919	----------	----------	----------
	230, 802	24, 825. 08	2, 850, 687	41, 662	864, 251	----------

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[13] Includes 20 tons of old tailings cyanided.

[14] Includes 2,400 tons of old tailings cyanided.

[15] Includes 855 tons of old tailings concentrated.

[16] Includes 25 tons of old tailings cyanided.

[17] Includes 6,000 tons of old tailings concentrated.

[18] Includes 675 tons of old tailings sold to a smelter.

[19] Consists of old tailings concentrated.

[20] Includes 175 tons of old tailings cyanided.

[21] Consists of old tailings cyanided.

Ore, old tailings, etc., sold or treated in Nevada, 1925 and 1926, by counties, with content in terms of recovered metals—Continued

1926—Continued

COPPER ORE

County	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Clark	23	0.70	41	8,073		
Elko	1,203	49.20	3,977	202,907	1,417	
Eureka	3		182	845		
Lander	893	51.22	4,617	178,380		
Lyon	215,258	12.00	11,671	5,450,247		
Mineral	199	7.00	140	26,497		
Nye	34	2.00	159	3,388		
White Pine	4,671,068	36,286.83	121,529	[22] 95,000,561		
	4,888,681	36,408.95	142,316	100,870,898	1,417	

LEAD ORE

Churchill	791	81.80	26,128	1,437	447,636	
Clark	[23] 5,737	2,424.18	18,545	10,962	1,606,548	
Douglas	47	1.08	1,632	51	19,735	
Elko	[24] 10,869	52.02	135,631	73,317	3,224,730	
Esmeralda	229	46.12	4,116	1,490	68,919	
Eureka	34,812	3,880.51	154,608	66,432	5,643,394	
Humboldt	46	6.33	2,365	30	24,445	
Lander	28,064	110.97	776,919	58,953	426,487	
Lincoln	313	.58	3,744	1,575	208,197	
Mineral	19,232	722.24	187,419	12,336	284,319	
Nye	3,183	1,110.52	48,906	11,979	759,575	
Pershing	549	32.21	13,903	3,652	215,413	
White Pine	7,393	69.60	21,369	10,473	1,325,249	
	111,265	8,538.16	1,395,285	252,687	14,254,647	

COPPER-LEAD ORE

Lincoln	9,800	192.00	133,533	570,892	1,156,731	
Mineral	107	10.69	9,275	5,745	11,305	
White Pine	244	.82	4,662	18,163	117,181	
	10,151	203.51	147,470	594,800	1,285,217	

LEAD-ZINC ORE

Clark	4,063	14.60	3,265	2,061	422,047	2,033,387
Elko	62				4,963	18,527
Eureka	99	.30	299	82	10,311	22,104
Lander	11	.15	377	151	3,883	1,318
Lincoln	43,940	673.72	242,805	45,528	3,998,224	7,517,040
Mineral	18,850	12.47	42,865	3,587	1,397,474	910,125
Washoe	276	8.09	20,182	3,646	56,517	69,664
White Pine	340	40.46	12,820	2,719	51,369	51,900
	67,641	749.79	322,613	57,774	5,944,788	10,624,065

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[22] Includes 341,843 pounds of copper saved from precipitates recovered from mine water, largely from leaching of ore in place.

[23] Includes 300 tons of old tailings concentrated.

[24] Includes 1,120 tons of slag sold to a smelter.

The following table shows the kind and grade of zinc material marketed in 1925 and 1926:

Zinc ore, lead-zinc ore, and zinc and lead-zinc concentrates (as marketed from Nevada mines and mills) sold to smelters, 1925 and 1926

Classification	County	Quantity (dry weight)	Gross zinc	Average assay of ore or concentrates	Recovered zinc
1925		*Short tons*	*Pounds*	*Per cent*	*Pounds*
Oxidized zinc ore	Clark, Elko, and White Pine	320	251, 547	39. 30	212, 656
Sulphide zinc ore	Clark and Lincoln	503	170, 734	16. 97	129, 648
Oxidized lead-zinc ore	do	8, 232	4, 925, 686	29. 92	3, 947, 479
Zinc and lead-zinc concentrates.	Clark, Esmeralda, Lincoln, Mineral, Washoe, and White Pine.	14, 552	12, 323, 995	42. 34	10, 531, 510
		23, 607	17, 671, 962	37. 43	14, 821, 293
1926					
Oxidized zinc ore	Clark	265	212, 204	40. 04	176, 775
Sulphide zinc ore	Eureka	47	21, 241	22. 60	16, 993
Oxidized lead-zinc ore	Clark and Elko	3, 049	2, 041, 708	33. 48	1, 599, 332
Zinc and lead-zinc concentrates.	Clark, Eureka, Lander, Lincoln, Mineral, Washoe, and White Pine.	10, 546	10, 483, 371	49. 70	9, 024, 733
		13, 907	12, 758, 524	45. 87	10, 817, 833

METALLURGIC INDUSTRY

The metal output of Nevada in 1926 came chiefly from the smelting of concentrates and first-class ore, but a large quantity of gold and silver was recovered by amalgamation and cyanidation. There was a slight decrease in the value of metals recovered from crude smelting ore and a decrease of nearly 20 per cent in yield from gold and silver mills, but there was an increase of nearly 20 per cent from concentrates.

Sixty-six milling plants in Nevada treated ore and old tailings in 1926. Of these, 23 used the amalgamation process, 20 concentration (7 used flotation, 3 tables and flotation, and 10 tables only), 12 cyanidation, 2 concentration and cyanidation, 1 amalgamation and cyanidation, 6 amalgamation and concentration (1 of these used flotation), 1 amalgamation, cyanidation, and concentration, and 1 was a leaching plant where copper was recovered by precipitation largely from ore in place.

A list of the milling plants, with details of their equipment, in Nevada in 1925, prepared by the Bureau of Mines, may be had upon request.

About 550 pounds of quicksilver were purchased for amalgamation plants and 1,787,957 pounds of sodium cyanide were used in cyanidation mills.

The output of milling ore and old tailings in 1926 was 5,687,993 tons, of which 744,900 tons of ore and 4,060 tons of old tailings were treated by amalgamation or cyanidation and 4,901,878 tons of ore and 37,155 tons of old tailings by concentration followed by smelting. The ore and old tailings treated by cyanidation (717,582 tons) yielded on the average $3.14 in gold and 5.95 ounces of silver to the ton. The ore amalgamated (31,378 tons) yielded bullion averaging $6.13 in gold and 0.20 ounce of silver to the ton. Of the total ore and other material, 84 per cent was of concentrating grade and produced concentrates which, with those from gold and silver mills, yielded on the average $36.43 in metals a ton.

The ore of smelting grade represented 3 per cent of the total quantity of ore and other material mined or treated and consisted mainly of first-class copper ore, lead ore, and dry and siliceous ore. The quantity of copper ore smelted increased 68 per cent in 1926; more than half of it was oxidized. The lead ore of smelting grade, half of which was sulphide, increased from 26,812 to 30,400 tons. The quantity of lead-zinc ore smelted decreased 63 per cent.

The miscellaneous material, other than ore and old tailings milled and crude ore smelted, was not important. It consisted of precipitates and of 1,795 tons of slag and old tailings smelted and yielded 57.35 ounces of gold, 11,945 ounces of silver, 364,073 pounds of copper, and 331,223 pounds of lead.

Mine production of metals from gold and silver mills in Nevada in 1926, by counties

County	Ore and old tailings treated		Recovered in bullion				
	Ore	Old tailings	Amalgamation		Cyanidation		Total value
			Gold	Silver	Gold	Silver	
	Short tons	*Short tons*	*Fine ounces*	*Fine ounces*	*Fine ounces*	*Fine ounces*	
Churchill	101		11.94	6	102.67	902	$2,936
Clark	2,934		348.05	181	398.51	13,962	24,258
Douglas	17		15.00	8			315
Elko	52,585		125.38	130	24,888.23	53,089	550,286
Esmeralda	32,019	20	439.66	862	5,086.38	506,731	430,972
Eureka	7		10.29	2	15.51	314	730
Humboldt	365		67.03	19	8.26	5,165	4,791
Lander	44,638		64.07	40	803.84	289,422	198,565
Lyon	529	2,400	364.75	292	234.90	4,043	15,101
Mineral	189		142.73	85	82.82	1,310	5,534
Nye	135,222		6,291.83	3,831	21,390.84	1,864,523	1,738,105
Ormsby	1		1.32	2			28
Pershing	409	175	386.57	312	62.46	3,419	11,610
Storey	475,609	25	349.36	310	56,046.87	1,520,568	2,114,842
Washoe	275		679.29	248	2.16	93	14,300
White Pine		1,440			1.47	5,919	3,723
	744,900	4,060	9,297.27	6,328	109,124.92	4,269,460	5,116,096
Total, 1925	813,850	[1] 3,432	12,191.21	7,742	122,205.09	5,073,425	6,304,548

County	Concentrates and recovered metal					
	Concentrates produced	Gold	Silver	Copper	Lead	Total value of metal
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	
Clark	16	70.92	1,801	63	1,420	$2,713
Elko	3	23.20	718			928
Esmeralda	4	52.19	109		358	1,176
Lander	333	35.15	43,394	1,774	33,716	30,750
Lyon	7	17.00	251			508
Storey	23	38.00	300			973
	386	236.46	46,573	1,837	35,494	37,048
Total, 1925	391	198.94	39,975	2,816	58,604	37,354

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[1] Includes 42 tons of sweeps.

Mine production of metals from concentrating mills in Nevada in 1926, by counties

County	Ore and old tailings treated		Concentrates and recovered metal						
	Ore	Old tailings	Concentrates produced	Gold	Silver	Copper	Lead	Zinc	Total value of metal
	Short tons	*Short tons*	*Short tons*	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*	
Clark	5,342	300	1,298	783.30	14,768	5,278	810,008	452,582	$124,890
Elko	2,624		334	3.18	20,236	1,074	321,668		38,575
Esmeralda	50		14	.50	338	228	6,670		786
Eureka	21,555		2,746	374.01	49,649	6,231	2,252,657	22,104	221,456
Lander	28,927		2,105	1,103.71	756,458	58,554	352,005	1,318	531,303
Lincoln	43,940		13,654	673.72	242,805	45,528	3,998,224	7,517,040	1,055,447
Lyon	188,319	30,000	14,247	386.44	37,861	4,555,436			669,375
Mineral	37,355	855	2,710	252.85	145,781	13,879	1,529,531	910,125	288,759
Storey	50	6,000	86	517.61	10,295	3,336			17,591
Washoe	276		150	8.09	20,182	3,646	56,517	69,664	23,018
White Pine	4,573,440		409,444	35,137.25	133,591	88,883,703	325,767	51,900	13,283,384
	4,901,878	37,155	446,788	39,240.66	1,431,964	93,576,893	9,653,047	9,024,733	16,254,584
Total, 1925	3,961,638	4,900	429,349	37,259.29	1,277,324	72,771,602	10,296,124	10,531,510	13,686,404

Mine production of metals from Nevada concentrates in 1926

BY COUNTIES

	Concentrates	Gold	Silver	Copper	Lead	Zinc	Total value of metal
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*	
Clark	1,314	854.22	16,569	5,341	811,428	452,582	$127,603
Elko	337	26.38	20,954	1,074	321,668		39,503
Esmeralda	18	52.69	447	228	7,028		1,962
Eureka	2,746	374.01	49,649	6,231	2,252,657	22,104	221,456
Lander	2,438	1,138.86	799,852	60,328	385,721	1,318	562,053
Lincoln	13,654	673.72	242,805	45,528	3,998,224	7,517,040	1,055,447
Lyon	14,254	403.44	38,112	4,555,436			669,883
Mineral	2,710	252.85	145,781	13,879	1,529,531	910,125	288,759
Storey	109	555.61	10,595	3,336			18,564
Washoe	150	8.09	20,182	3,646	56,517	69,664	23,018
White Pine	409,444	35,137.25	133,591	88,883,703	325,767	51,900	13,283,384
	447,174	39,477.12	1,478,537	93,578,730	9,688,541	9,024,733	16,291,632
Total, 1925	429,740	37,458.23	1,317,299	72,774,418	10,354,728	10,531,510	13,723,758

BY KINDS OF CONCENTRATES

Dry and siliceous	1,280	2,387.75	40,340	14,522	2,929		$76,798
Copper	422,602	35,082.78	127,643	93,428,646			13,884,884
Lead	12,746	1,677.30	1,223,988	103,627	9,218,671		1,550,444
Zinc	10,543	318.77	86,538	31,835	465,941	9,022,933	779,042
Lead-zinc	3	10.52	28	100	1,000	1,800	464

AVERAGE RECOVERABLE CONTENT

	Short tons	*Fine ounces per ton*	*Fine ounces per ton*	*Per cent*	*Per cent*	*Per cent*	*Value per ton*
Dry and siliceous	1,280	1.865	31.52	0.57	0.11		$60.00
Copper	422,602	.083	.30	11.05			32.86
Lead	12,746	.132	96.03	.41	36.16		121.64
Zinc	10,543	.030	8.21	.15	2.21	42.79	73.89
Lead-zinc	3	3.507	9.33	1.67	16.67	30.00	154.67
	447,174	.088	3.31	10.46	1.08	1.01	36.43
Total, 1925	429,740	.087	3.07	8.47	1.20	1.23	31.94

Mine production of metals from Nevada crude ore shipped to smelters in 1926

BY COUNTIES

	Ore	Gold	Silver	Copper	Lead	Zinc	Total value of metal
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*	
Churchill	795	95.84	26,582	1,453	447,788		$54,594
Clark	4,449	1,675.10	8,409	15,899	1,233,171	1,757,580	272,573
Douglas	47	1.08	1,632	51	19,735		2,626
Elko	8,396	101.99	114,086	254,159	2,623,006	18,527	320,110
Esmeralda	2,041	3,316.01	16,148	2,887	63,806		84,132
Eureka	13,406	3,506.80	105,459	61,128	3,401,048	16,993	420,215
Humboldt	48	15.45	2,558	30	24,445		3,875
Lander	1,784	508.30	36,222	180,943	79,516		64,804
Lincoln	24,481	291.25	178,571	595,295	2,145,889		372,461
Lyon	27,290	596.55	1,120	901,911			139,299
Mineral	2,011	1,270.20	140,520	43,175	163,869		133,097
Nye	3,562	1,517.25	71,622	17,271	761,682		139,408
Pershing	757	180.03	16,900	4,245	215,995		32,142
Storey	83	192.44	2,643	54			5,635
Washoe	9	12.00	1,295	194			1,083
White Pine	105,621	1,278.56	27,452	5,806,439	1,168,251		949,922
	194,780	14,558.85	751,219	7,885,134	12,348,201	1,793,100	2,995,976
Total, 1925	139,303	12,685.56	680,673	5,975,740	13,008,611	4,289,783	3,040,948

BY KINDS OF ORE

Dry and siliceous	18,778	5,715.89	143,687	34,258	786,344		$275,523
Copper	132,090	1,326.17	14,673	7,100,409	1,417		1,030,740
Lead	30,400	7,313.28	444,762	155,667	9,901,518		1,242,626
Zinc	312		627		14,470	193,768	16,081
Copper-lead	10,151	203.51	147,470	594,800	1,285,217		282,317
Lead-zinc	3,049				359,235	1,599,332	148,689

AVERAGE RECOVERABLE CONTENT

	Short tons	*Fine ounces per ton*	*Fine ounces per ton*	*Per cent*	*Per cent*	*Per cent*	*Value per ton*
Dry and siliceous	18,778	0.304	7.65	0.09	2.09		$14.67
Copper:							
Oxidized	80,049	.010	.10	2.10			6.15
Sulphide	52,041	.010	.13	3.59			10.35
Lead:							
Oxidized	14,646	.200	20.50	.26	21.91		52.74
Sulphide	15,754	.277	9.18	.24	11.05		29.84
Zinc:							
Oxidized	265		2.29		2.73	33.35	55.83
Sulphide	47		.40			18.08	27.36
Copper-lead:							
Oxidized	10,044	.019	13.76	2.93	6.34		27.34
Sulphide	107	.099	86.68	2.68	5.28		72.12
Lead-zinc: Oxidized	3,049				5.89	26.23	48.77
	194,780	.074	3.86	2.02	3.17	.46	15.38
Total, 1925	139,303	.091	4.89	2.14	4.67	1.54	21.83

REVIEW BY COUNTIES AND DISTRICTS

CHURCHILL COUNTY

The mine production of metals in Churchill County was valued at $57,530 in 1926, a decrease of $71,941 from 1925. The decrease was largely in lead and silver and was caused by the marked decline in the shipments of silver-lead ore from the property of the Chalk Mountain Silver-Lead Mines Co.

Broken Hills district.—The Broken Hills mine, under lease, produced one lot of oxidized lead ore containing considerable silver. The property is close to the border line between Mineral and Churchill Counties.

Fairview district.—Five lode mines in the Fairview district produced 783 tons of ore, yielding $1,932 in gold, 23,569 ounces of silver, 1,453 pounds of copper, and 446,036 pounds of lead, valued in all at $52,525, or $67.08 in metals a ton. With the exception of one small lot treated by amalgamation, the output was first-class smelting ore. Several hundred tons of oxidized lead ore were shipped from the Chalk Mountain property, owned by the Chalk Mountain Silver-Lead Mines Co. The mine was operated continuously, the shaft was sunk an additional 182 feet to the water level, and 1,500 feet of work was done in drifts, crosscuts, and raises. It is estimated that about 25,000 tons of lead ore have been exposed. Several cars of silver-lead ore were shipped by lessees from the Pat and Heritage groups; at the close of the year these properties were in the hands of the Nevada Chalk Mountain Mining Co.

Holy Cross district.—Small test lots of gold ore and silver ore were shipped from the Pyramid group.

Wonder district.—The old producing mines at Wonder were idle, but a little bullion containing gold and silver was cleaned up at the Wonder mine.

CLARK COUNTY

In Clark County 36 mines produced 13,025 tons of ore and old tailings in 1926, a decrease of about 11,000 tons from 1925. The total value of the metals decreased from $1,081,732 to $424,434, largely the result of the decrease in lead from 5,409,440 to 2,044,599 pounds and in zinc from 6,230,664 to 2,210,162 pounds. The output of lead and zinc from the property of the Yellow Pine Mining Co. was very small when compared with that of past years.

Charleston district.—The Charleston group, 35 miles west of Las Vegas in Kyle Canyon, produced several lots of oxidized lead-zinc ore, which were shipped to Coffeyville, Kans.

Dike district.—One car of oxidized lead ore was shipped from the Spearmaid claim, 15 miles north of Las Vegas and 1 mile north of Dike on the Union Pacific Railroad.

Eldorado Canyon district.—Four lode mines in the Eldorado Canyon district produced 2,104 tons of ore, yielding $28,539 in gold, 17,714 ounces of silver, 2,816 pounds of copper, 18,808 pounds of lead, and 1,800 pounds of zinc, valued in all at $41,628, or $19.79 in metals a ton. Of the ore produced, 789 tons were milled, yielding 82 tons of concentrates, and 1,315 tons were treated in amalgamation or cyanidation mills, yielding gold and silver bullion. No first-class ore was shipped for smelting. The largest part of the output was gold and silver bullion recovered from the Silver Legion group of the Eldorado Gold Star Mining Co. A small lot of rich concentrate containing gold and silver was shipped to Midvale, Utah, for smelting. The Rand mine was operated a short time and gold and silver bullion, as well as a small lot of rich gold and silver concentrate, was recovered by amalgamation. The Techatticup mine, a large producer of gold and silver from 1915 to 1920, especially in 1916, was operated to a small extent and several hundred tons of gold ore were treated by concentration and flotation. Lead concentrate rich in gold was shipped to smelters in Utah. A test lot of lead-zinc ore from the San Juan claim was treated at the custom flotation plant at International, Utah.

Searchlight district.—Four lode mines in the Searchlight district produced 1,881 tons of ore, yielding $38,851 in gold, 1,720 ounces of silver, 7,430 pounds of copper, and 81,977 pounds of lead, valued in all at $47,522, or $25.26 in metals a ton; most of the ore was treated in an amalgamation mill and yielded gold and silver bullion. The Duplex mine, under lease, produced several cars of oxidized lead ore containing an unusually large quantity of gold, and a little gold bullion was recovered from ore treated by amalgamation. A test lot of rich gold ore was shipped from the Searchlight property, and a small quantity of gold bullion was recovered by amalgamation at the Red Bird claim.

Yellow Pine district.—Twenty-five lode mines in the Yellow Pine district produced 8,631 tons of ore and 300 tons of old tailings, yielding $326 in gold, 19,549 ounces of silver, 10,994 pounds of copper, 1,904,766 pounds of lead, and 2,181,686 pounds of zinc, valued in all at $330,071, or $36.96 in metals a ton. The ore of shipping grade, mostly carbonate, amounted to 4,078 tons and yielded $174 in gold, 6,626 ounces of silver, 8,469 pounds of copper, 1,112,146 pounds of lead, and 1,730,904 pounds of zinc. The mill ore (4,553 tons), with 300 tons of old tailings, was reduced to 1,232 tons of concentrates yielding $152 in gold, 12,923 ounces of silver, 2,525 pounds of copper, 792,620 pounds of lead, and 450,782 pounds of zinc. The value of the district output decreased decidedly from $984,827 in 1925. At the Yellow Pine property, formerly the largest producer of lead and zinc in the State, the mill and calciner were idle on account of insufficient ore, but oxidized lead-zinc ore and lead ore were shipped for smelting. The printed report of the Yellow Pine Mining Co. for 1926 gives the following notes:

> A fire of unknown origin destroyed the mine power plant on September 26. The building was immediately rebuilt, and the 75-horsepower oil engine and the compressor were reconditioned and put into service again. * * *
>
> The mine produced 2,274 tons of ore, which was derived from the old stopes south of the porphyry dike and from the crude zinc stopes below the 900 level. Some ore came from the 1,000 level in winze No. 914. * * *
>
> The following development work was done on Yellow Pine ground:
>
> Two hundred and twenty-three feet of drifts and 27 feet of crosscuts were driven in the south end of the 900 level.
>
> Winze No. 914 was equipped with a 20-horsepower, 440-volt electric hoist and sunk an additional 200 feet to the 1,200 level. Two hundred and thirty-two feet of drifts and crosscuts were driven on the 1,200 level. A crosscut 60 feet in length was driven on the 100 level of this winze.
>
> The following development work was done in Prairie Flower ground:
>
> The 900 level of the Yellow Pine mine was connected with the bottom of the Hale shaft on the 400 Prairie Flower level, and the 400 level was connected with the bottom of the old Prairie Flower shaft. A good showing of lead ore was encountered on the 400 level between the Hale shaft and the Prairie Flower shaft, and a winze is now being sunk at this place in the hope of this showing leading to an ore body below the 400 level. * * *
>
> A new inclined shaft of 50°, located about north 60° east, 750 feet from the Prairie Flower shaft, was sunk a distance of 17.5 feet, but it did not look very promising and work was suspended indefinitely. * * *
>
> The company shipped 2,153 tons of mixed ore, containing 8.66 per cent of lead and 32.86 per cent of zinc, and 121 tons of lead ore, containing 11.8 ounces of silver to the ton and 35.87 per cent of lead. * * *
>
> There were no dividends paid during the year.

A few hundred tons of zinc ore and lead-zinc ore from the Potosi mine near Arden, owned by the Empire Zinc Co., were shipped for smelting; some lead-zinc ore was also shipped to International, Utah, for custom milling; late in the year the mine was sold to the

International Smelting Co. The 50-ton concentration plant at the Anchor mine, equipped with jigs and tables, was operated intermittently on lead ore, and several hundred tons of lead concentrate and considerable lead ore and lead-zinc ore were shipped for smelting; some of the lead concentrate contained as much as 57 per cent of lead and 15 ounces of silver to the ton. At the Bullion property, near Goodsprings, about 1,500 tons of lead ore were milled, and the resulting concentrate, with crude lead ore and lead-zinc ore, was shipped for smelting; for these products the smelters paid $14,316. Several cars of lead ore were shipped from the Galena Canyon property; other producers were the Ingomar, Lead Point, Maiden Rock, Tam O'Shanter, Over, and Shenandoah properties. Lead-zinc ore was shipped from the Galena Canyon, Milford, Ingomar, New Year, Pilgrim, Shenandoah, Carbonate No. 2, and Tam O'Shanter claims. A little dump ore containing silver and lead from the Sultan mine was milled locally, as well as some old tailings from the Frederick property.

DOUGLAS COUNTY

Mountain House district.—A little gold bullion was recovered by amalgamation from the Willard-McDonald property of the Carson Valley Mining Co.

Red Canyon district.—The Longfellow property, operated by the Detroit Gold Mining & Milling Co., produced a little gold ore that was treated by amalgamation.

Wellington district.—The Boulder Hill Exploration Co., operating the Boulder Hill mine near Wellington, shipped a car of silver-lead ore to Midvale, Utah, for smelting.

ELKO COUNTY

In 1926 the value of metals produced from 35 mines in Elko County was $939,581, a decline of $10,817 from 1925, due largely to the decrease in the output of gold from the property of the Elkoro Mines Co. The quantity of ore and slag decreased from 67,294 tons to 64,725 tons, but there was a good increase in the output of silver and copper, and in the quantity of lead.

Contact district (Salmon River).—Oxidized copper ore from the Delano property of the Nevada Bellevue Copper Co. and oxidized lead ore from the Silk Worm group were shipped to Utah for smelting. The Delano mine is opened by nearly 7,000 feet of workings, and 700 feet of development was done during 1926. The company also installed a plant for leaching the ore in place, the capacity of the precipitation tanks being about 5,000 pounds of copper a day. A solution containing 3 per cent of sulphuric acid will be used to percolate through the vein, which contains carbonate, oxide, silicate, and sulphide copper minerals.

Cope district.—The Silver Banner Mining Co., operating the Nelson property, shipped a small test lot of silver ore containing gold.

Delano district.—Three lode mines in the Delano district produced 2,778 tons of ore, yielding $157 in gold, 25,256 ounces of silver, 1,724 pounds of copper, and 392,805 pounds of lead, valued in all at $47,583, or $17.13 in metals a ton. Nearly all the output was milling ore from the Net mine of the Panther Mines Co. north of Montello; the 30-ton concentration plant was operated, and lead concentrate with crude ore was shipped to International, Utah. A little first-class lead ore was also shipped from the Cleveland property and the Gold Note claim.

Gold Circle district (Midas).—A little gold ore from the Esperanza mine was treated in a small amalgamation mill. The Elko Prince mine, formerly a large producer of gold, was consolidated with the Big Chief property under the name of the Gold Circle Consolidated Mining Co., and late in the year a new 75-ton cyanidation mill was being constructed. Much ore blocked out in the Missing Link and Giant properties is said to be ready for the new plant.

Granite district (Dolly Varden).—One car of lead ore from the Dolly Varden Queen property was shipped from Mizpah on the Nevada Northern Railway.

Island Mountain district.—Development work was done by a lessee at the Hammond property near Gold Creek, but the mill, a 6-ton plant equipped with Hardinge mill and Wilfley concentrator, was idle on account of the shortage of water.

Jarbidge district.—Five lode mines in the Jarbidge district produced 52,444 tons of ore, yielding $515,886 in gold and 53,861 ounces of silver, valued together at $549,495, or $10.48 a ton. The Elkoro Mines Co., one of the largest producers of gold in Nevada since 1918, operated the Long Hike mine and the 100-ton cyanidation plant throughout the year. The mine is extensively developed by about 20,000 feet of drifts and crosscuts, and more than 6,000 feet of work was done during the year. According to a statement in the annual report of the Yukon Gold Co., which controls the property, a total of 32,233 tons of ore was milled, yielding a gross revenue of $343,225 in gold and silver, or an average of $10.65 a ton. The total cost of mining and milling, excluding depreciation and development, was $179,032, or $5.55 a ton. The operating profit after deducting $74,059 for current development work was $90,134. The following paragraphs are taken from this annual printed report of the Yukon Gold Co.:

> This company has had under lease certain other properties in the neighborhood of its own holdings and expended thereon during the year in development work the sum of $20,499.
>
> At the beginning of the year 1926 there was only a small quantity of ore available, but during the year two promising ore shoots were encountered in development, which, together with some ore from old stopes, supplied enough ore to permit the continuance of operations on a scale sufficient to defray development costs and show a small profit. Work is being actively prosecuted on these new workings, and the present indications are favorable, although no ore bodies of any great size or value have as yet been developed.

The Bluster and the Pick & Shovel groups at Jarbidge were operated by the United Eastern Mining Co., and nearly 20,000 tons of gold ore was treated in an 80-ton cyanidation plant. The company did 2,700 feet of development work and produced considerable bullion, but the results were evidently not encouraging, as the property was closed early in 1927. The Alpha mine, owned by the Jarbidge-Nevada Mining Co., was operated a short time and produced a little gold bullion and concentrate containing gold and silver. From the Arizona property, worked by lessees, one lot of gold ore was shipped to the Elkoro cyanidation plant.

Merrimac district.—The Alaska Improvement Co. shipped several cars of first-class lead ore from the Rip Van Winkle mine.

Mud Springs district.—As a result of development work at the Silver Butte property, 32 miles from Currie on the Nevada Northern Railway, several cars of oxidized lead ore were shipped to Midvale, Utah, for smelting.

Railroad district.—Practically all the output of the Railroad district consisted of old slag shipped from the Bunker Hill dump to a smelter in California. The mine was worked by lessees the entire year, but the grade of the ore developed was too low to ship profitably.

Rowland district.—The Bruneau Mining Co. did 700 feet of development and produced gold bullion through the operation of a 3-stamp amalgamation mill; the property is 100 miles north of Elko on the Southern Pacific Railroad.

Ruby Mountain Range district.—Lessees operating the L. C. mine, 45 miles west of Tobar on the Western Pacific Railroad, shipped several cars of lead ore to the smelter at Murray, Utah.

Spruce Mountain district.—Seven lode mines in the Spruce Mountain district produced 6,383 tons of ore and slag, yielding $813 in gold, 95,150 ounces of silver, 50,643 pounds of copper, and 2,197,074 pounds of lead, valued in all at $243,043, or $38.08 in metals a ton. The output was chiefly oxidized lead ore shipped for smelting. At the Black Forest property, where lead ore occurs as a replacement in limestone, about 1,000 feet of development was done and nearly 3,000 tons of silver-lead ore were shipped for smelting. About 2,000 tons of similar ore were shipped from the Spruce Monarch property, where 300 feet of development was reported. After being idle nine years, the Kille mine was reopened in May and operated by the Spruce Consolidated Mines Co., which was succeeded at the close of the year by the Nevada Lead & Zinc Co. Nearly 700 tons of silver-lead ore were hauled 18 miles to Jasper, a station on the Western Pacific Railroad. Several hundred tons of oxidized lead ore containing silver were shipped by way of Tobar from the Ada H property, worked by the Paramount Consolidated Mining Co. Several cars of lead ore from the Bullshead mine were shipped by lessees, and two cars of old slag were hauled from the Spruce Standard dump.

Tecoma district.—Several cars of oxidized lead ore were shipped from the Jackson mine, on Jackson Mountain.

Tuscarora district.—Small test lots of gold ore and silver ore were shipped from the Tuscarora district. Small seams of silver ore are being developed at the Nevada claim, 52 miles north of Elko.

Warm Creek district.—The Polar Star mine, 16 miles southeast of Tobar, owned by the Nevada Zinc Mining Co., produced several lots of carbonate lead ore and carbonate lead-zinc ore, both shipped for smelting. A small lot of lead ore was also shipped from the Parker claim.

ESMERALDA COUNTY

The value of the mine production of metals in Esmeralda County increased from $286,023 in 1925 to $517,067 in 1926, as a result of the large increase in the output of silver from the Tonopah Divide property and from properties in the western part of the Tonopah district in Esmeralda County. There was also a small increase in the output of gold, but decreases in copper and lead. No zinc was produced in the county in 1926. The quantity of ore and old tailings from 37 lode mines increased to 34,130 tons; most of it was treated by cyanidation.

Alpine district.—A small lot of gold ore from the Treasure Hill property was shipped to the custom cyanidation plant at Millers.

Coaldale district.—A small test lot of lead ore rich in silver was shipped from the Brown Bee property in the Monte Cristo Range, 30 miles northwest of Millers.

Desert district (*Gilbert*).—The output of the Desert district came chiefly from the property of the Gilbert Mammoth Last Hope Mines Co. and the Homestake Monte Cristo Gold Corporation. Siliceous gold ore from both mines was shipped to the Millers plant to be treated by cyanidation, and a little rich gold ore was shipped for smelting. The gold and silver recovered from ore shipped from the district were valued at $20,515, or $18.58 a ton. The Homestake company reported 6,000 tons of $10 gold ore in reserve and 300 feet of development done in drifts and crosscuts in 1926.

Divide (*Gold Mountain*) *district.*—The property of the Tonopah Divide Mining Co. at Divide, 6 miles south of Tonopah, produced considerable gold and silver through the operations of lessees. The company received a royalty of $27,625 from 11,000 tons of silver ore treated at Millers and Tonopah.

Dyer district.—While doing development work one car of silver ore was shipped from the Queen of the Hills property, 32 miles southwest of Coaldale on the Tonopah & Goldfield Railroad.

Goldfield district.—Six lode mines in the Goldfield district produced 1,250 tons of ore, yielding $45,395 in gold, 1,251 ounces of silver, and 1,425 pounds of copper, valued in all at $46,376, or $37.10 in metals a ton. Nearly half the ore was shipped for smelting and the remainder was treated by cyanidation. Most of the output was from the Goldfield Consolidated property, the largest producer of gold in Nevada from 1906 to 1918. No work was done on company account, but lessees shipped several hundred tons of gold ore to the custom cyanidation plant at Millers and shipped also several hundred tons to the Mason Valley smelter at Thompson. The company owns a large dump of gold-bearing tailings accumulated from the operations of the 100-stamp mill, and part of this material will be re-treated by cyanidation in 1927. Gold ore was also shipped from the Great Bend, Florence Goldfield, and Merger mines. At the last-named property much shaft sinking has been done by the Goldfield Deep Mines Co., which has spent a fortune in diamond drilling and sinking to explore the property at depth.

Hornsilver district.—Five lode mines in the Hornsilver district produced 144 tons of ore, yielding $1,815 in gold, 1,423 ounces of silver, 51 pounds of copper, and 5,910 pounds of lead, valued in all at $3,183, or $22.10 in metals a ton. Most of the output was gold and silver ore shipped for treatment by cyanidation. Several lots of gold ore from the Black Wonder and Calavada mines were shipped to the custom cyanidation plant at Millers, a little silver ore for both smelting and milling was marketed from the Hornsilver-American and Southwestern claims, and a test lot of oxidized lead ore was shipped from the Kendall-Hornsilver mine. At the Calavada mine development work was being done in a 200-foot shaft, samples from which were said to average about $23 a ton in gold and silver.

Klondyke district.—The output of the Klondyke district consisted chiefly of one car of siliceous silver ore from the Original Klondyke Divide mine and a car of oxidized silver-lead ore from the Lucky Boy Divide property.

Lida district (*Tule Canyon*).—Small test lots of silver ore and oxidized lead ore containing considerable silver were shipped from the Columbus and Kangaroo claims.

Lone Mountain district.—Two cars of lead ore and concentrate, probably recovered from dump material at the old General Thomas mine, were shipped from McSweeney on the Tonopah & Goldfield Railroad.

Montezuma district.—A few small lots of oxidized lead ore were shipped from claims near Goldfield, chiefly from the Silvia and Monitor groups.

Silver Peak district.—As in past years, the output of the Silver Peak district was chiefly that of the Mary (Silver Peak) mine, operated by the Lucky Boy Divide Mining Co. More than 1,000 tons of gold ore were shipped to the Mason Valley smelter at Thompson, gold ore was shipped to Millers to be treated by cyanidation, and other ore was treated locally by amalgamation. A few cars of rich gold ore from the Valcalda mine were smelted at the Mason Valley plant, and a small lot of old tailings from the Great Gulch property was treated by cyanidation.

Tokop (*Gold Mountain*) *district.*—A test lot of oxidized lead ore containing considerable gold was shipped from the Courbet claim, and a car of sulphide lead ore was shipped from the French mine, 10 miles south of Hornsilver.

Tonopah district.—A considerable increase was shown in silver ore produced from the western part of the Tonopah district in Esmeralda County. Three lode mines produced 18,274 tons of ore, yielding $34,065 in gold and 205,268 ounces of silver, valued together at $162,152, or $8.87 a ton; these figures are included in the output of the Tonopah district given in the table under Nye County. The output consisted of silver ore from the Tonopah "76," West End Extension, and the western portion of the property belonging to the Tonopah Extension Mining Co. All the ore was treated at Tonopah, either at the West End mill or the Tonopah Extension plant. At the Tonopah Western property, opened by a shaft 1,150 feet deep, 823 feet of crosscutting was done.

Windypah district.—The Ruth group, the post office of which is Oasis, Calif., was being developed, and one small car of sulphide lead ore was shipped from Blair Junction on the Tonopah & Goldfield Railroad.

EUREKA COUNTY

In 1926 the output of each of the metals in Eureka County increased in both quantity and value. The largest actual increase was in lead, the value of gold was more than doubled, and there was a fair increase in silver. Nineteen mines produced metals valued at $642,703, an increase of $156,259. The Eureka-Holly and Richmond-Eureka properties produced most of the output.

Cortez district.—A small lot of oxidized copper ore containing considerable silver was shipped from the Rico claim in Frenchy Canyon of the Cortez Range, 17 miles south of Beowawe.

Eureka district.—Fourteen lode mines in the Eureka district produced 34,816 tons of ore, yielding $80,504 in gold, 153,979 ounces of silver, 66,194 pounds of copper, 5,568,282 pounds of lead, and 39,097 pounds of zinc, valued in all at $634,249, or $18.22 in metals a ton. Most of the output was ore concentrated and reduced to 2,746 tons of concentrates which, with 13,255 tons of crude ore, were shipped for smelting. One small lot of gold and silver ore from the Cyanide group was treated at a custom cyanidation plant at Tonopah. The largest producer of both silver and lead in the district was the Eureka-Holly mine, worked by the Eureka-Holly Mining Co. No large tonnage of ore was in reserve, but constant development work supplied enough ore to run the 100-ton concentration-flotation plant. Oxidized lead ore is sulphidized prior to flotation. Crude ore, with table and flotation concentrates, was shipped to Midvale, Utah, for smelting. From the Williamsburg mine several hundred tons of lead ore and concentrate containing gold and silver were shipped to a smelter in Utah. Mill ore was treated in the Eureka-Holly plant. Lessees shipped a large quantity of first-class silver-lead ore from the Richmond-Eureka property to the smelter at Midvale, Utah. From the old speiss dumps at this property, which is controlled by the United States Smelting, Refining & Mining Co., a large quantity of lead-arsenic material was shipped in 1924. A test lot of zinc ore was shipped to an eastern zinc plant. Shipments of lead ore were made from the Eureka Croesus, Excelsior & Diamond, Helen Mortimer, Hamburg, Phillipsburg, Lucia Tuffa, Nevada Exploration, and Steel Galena properties, all near Eureka on the Eureka Nevada Railway. A little lead-zinc ore from the Mount Hope mine, worked by lessees, was shipped to a custom flotation plant.

Lynn district.—The Lynn Big Six property was not vigorously operated, but gold bullion, possibly from former work, was sold at Salt Lake City, Utah. A little placer gold from the Bulldog claim, north of Carlin, was also disposed of at the assay office at Salt Lake City, Utah.

Mineral Hill district.—Several cars of oxidized silver-lead ore were shipped from the Union property near Union on the Eureka Nevada Railway.

HUMBOLDT COUNTY

The value of the mine production of metals in Humboldt County in 1926 was $9,410, a decrease of $6,542 from 1925. The decrease in the value of the gold and silver was more than $8,000, but there was an increase in the output of lead. The placer production, which is included in the totals above, was valued at $743 in 1926.

Black Rock district.—In doing development work a little gold was recovered from the Ownership prospect near Sulphur.

Gold Run district (Adelaide).—Four lode mines in the Gold Run district produced 44 tons of ore, yielding $131 in gold, 2,358 ounces of silver, and 22,026 pounds of lead, valued in all at $3,364, or $76.45 in metals a ton. First-class lead ore was shipped from the Moore, Radio, Black Diamond & Leadville, and Great Republic properties. At the Gold Coin group, 12 miles from Golconda on both the Southern Pacific and Western Pacific Railroads, a 12-ton mill was built which is equipped for amalgamation and concentration. A considerable amount of low-grade mill ore is said to be blocked out or estimated at the Black Diamond & Leadville property.

National district.—The output of the National district consisted of a test shipment of gold and silver ore picked from the dump of the Buckskin National Gold Mining Co. The company did some drifting, but the 50-ton flotation mill was idle. A little placer gold recovered near National was shipped to the Denver Mint.

Paradise district.—A small sample of oxidized lead ore was marketed from the Ford claim, 10 miles north of Golconda, and a little placer gold was recovered at the Dutch Flat claim.

Preble district.—The Dolomite Silver Mining Co., leasing the Dolomite mine, treated silver ore by cyanidation and marketed some bullion. Late in the year, however, the property was returned to the original owner.

Ten Mile district.—A little gold was recovered by amalgamation from the Meyers Extension and other claims near Winnemucca.

Warm Springs district (*Vicksburg*).—The Ashdown mine, 125 miles north of Winnemucca, was operated only for assessment work, but a little gold bullion was marketed after running the 50-ton ball mill a short time.

Winnemucca district.—A small lot of silver bullion and several lots of placer gold recovered by dry washing were shipped to Denver, Colo., and to San Francisco, Calif.

LANDER COUNTY

In 1926 the quantity and value of each of the metals in Lander County were greater than in 1925, and the total value increased from $747,198 to $830,710, chiefly because of increases in gold, silver, and copper. Twenty-one lode mines produced 75,349 tons of ore, an increase of 10,315 tons, and the placer production was valued at $5,288. The most important producers were the Betty O'Neal Mines Co. near Battle Mountain and the Consolidated Cortez Silver Mining Co. at Cortez.

Battle Mountain district.—Eight placers and eight lode mines in the Battle Mountain district produced 913 tons of ore, $9,356 in gold, 5,208 ounces of silver, 153,172 pounds of copper, 54,221 pounds of lead, and 1,318 pounds of zinc, valued in all at $38,487. The ore had an average value of $36.36 in metals a ton. The placer output consisted of $5,266 in gold and 36 ounces of silver, valued together at $5,288. Most of the output was first-class copper ore and lead ore shipped for smelting, and nearly all the remainder was gold ore treated by cyanidation or amalgamation. The Copper Queen mine, under lease, 9 miles southwest of Battle Mountain in Copper Basin, produced nearly 500 tons of copper ore, which was chiefly oxidized. The Mines Development Co. of Nevada operated property owned by the Buffalo Valley Mines Co. and treated gold ore in a 10-ton cyanidation plant; the output was small, but development was continued throughout the year. Several cars of oxidized silver-lead ore were shipped from the Nicklas mine, southwest of Battle Mountain, operated by the International Leasing Co. A little gold ore was treated by amalgamation from claims near Battle Mountain, one lot of lead-zinc ore was shipped for custom milling, and a little lead ore was shipped from the Nevada and Pacific properties. The Buckingham Mina Consolidated Mines Co. did 600 feet of development in the Buckingham group and constructed a 50-ton concentration plant; the company reports 50,000 tons of silver-lead-zinc ore in reserve. The placer output resulted chiefly from drift mining and sluicing gravel at the Dahl, Grubstake & Annex, High Bar, and

Homestake properties in Copper Canyon, 20 miles southwest of Battle Mountain.

Bullion district.—Four lode mines in the Bullion district produced 2,070 tons of ore, yielding $29,867 in gold, 5,986 ounces of silver, 27,796 pounds of copper, and 15,300 pounds of lead, valued in all at $38,718, or $18.70 in metals a ton. Most of the ore was concentrated, but 870 tons were first-class ore containing chiefly gold, silver, and copper. The Gold Quartz property near Tenabo, formerly worked by the Toulon Arsenic Co., was operated by the Tenabo Consolidated Mines Co., and more than 800 tons of crude gold ore and concentrate were shipped to various smelting plants; the 50-ton concentration plant was operated only a short time, but much work was done at the property early in 1927. Several hundred tons of sulphide copper ore containing gold and silver were shipped from Beowawe by the Utah Mining & Engineering Corporation. Two cars of lead ore were shipped from the Nevada-Mexico and Utah mines; the latter was under the control of the Mineral Range Mining Co.

Cortez district.—The Garrison property of the Consolidated Cortez Silver Mines Co., which is close to the boundary of Lander and Eureka Counties, produced nearly 45,000 tons of silver ore that was treated in a 125-ton concentration-cyanidation plant. Bullion, concentrate, and a little crude ore were hauled 36 miles to Beowawe on the Southern Pacific Railroad. The output was said to have a gross value of about $236,000, and the company has in reserve approximately 25,000 tons of 25-ounce silver ore containing galena, sphalerite, and freibergite, the silver-bearing variety of tetrahedrite. The milling is done by gyratory crusher, ball and tube mills, Dorr classifier, Deister tables, Dorr countercurrent decantation, and Merrill precipitation. The printed report for 1926 gives the following paragraphs:

> At the beginning of 1926 the outlook for long-continued, profitable operation of the Cortez mine was not good. No ore bodies of importance had been developed, and the sole course of action open to the management was to continue milling the low-grade fills, together with available ore in place, with the hope that sufficient profit would be made to allow a moderate amount of development work, and that this work would expose new ore bodies.
>
> During the year 44,452 tons were milled, with an average content of 10.14 ounces of silver, and an average recovered value of $5.32. The average cost per ton was $5.16, this latter figure including all operating expense, taxes, insurance, boarding-house loss, and administration expense. Development work totaled 1,384 feet. The net operating profit was $6,682.
>
> In order to make a profit on this low-grade ore, it was necessary to eliminate development almost entirely for several months, to mill a maximum tonnage even at the expense of extraction.
>
> * * * However, during September the mill heads dropped to 8.05 ounces, and when the price of silver commenced to sag it was evident that the property faced an almost immediate shutdown.
>
> * * * In the Arctic tunnel, however, an ore body of milling grade had been partially developed, and it was thought that there was a possibility that a very small amount of development might yield favorable results.
>
> Three places were therefore selected and work started. Two of these passed immediately into ore of excellent grade, and the third cut a new ore body 70 feet from the starting point. * * *
>
> However, the new strikes began to make themselves felt in November, when 2,777 tons of 15.29 ounce grade were milled, giving a net profit of $4,881. * * *
>
> Although less than three months have elapsed from the date of opening these new ore bodies, it is already certain that two of them are of major importance, while the third holds out less promise for the future.
>
> During November and December operations resulted in a profit of $6,286, and there is reasonable assurance of profitable operations for several months.

Hilltop district.—The Blue Dick claim produced one car of silver ore and the Gray Eagle property sulphide lead ore containing considerable gold and silver. A little gold and silver were recovered from samples of rich gold ore from the O. K. property.

Lewis district.—The Betty O'Neal mine, 15 miles south of Battle Mountain, was the second largest producer of silver in Nevada in 1926. Mill ore containing galena and tetrahedrite was treated in a 250-ton flotation plant. According to the annual report to stockholders for 1926, the mine produced 38,840 tons of ore, of which 27,716 tons were milled and 11,124 tons were placed on the dump. From the milling ore 1,633 tons of concentrate were recovered, which contained 723,063 ounces of silver, an average of 442.8 ounces to the ton of concentrate. The concentrate also contains gold, copper, and lead not mentioned, and the company received net smelter returns of $426,584, after deduction of the charges for freight and treatment. The average value of the ore milled, in terms of net smelter returns, was $15.35 a ton. The ratio of concentration was 17½ tons of ore to 1 ton of concentrate. The mining and development cost was $7.65, milling $2.04, and indirect charges $1.30, or a total of $10.99. The dividends paid to stockholders in 1926 amounted to $211,000. Ore reserves were not published, but the silver content of the mill heads has increased from 14.10 ounces to the ton in 1922 to 26.48 ounces in 1926. The total silver content of the concentrate from 1922 to 1926 was 2,441,615 ounces. The mill extraction has also improved, being 98.5 per cent for 1926. The mine is opened by a shaft 400 feet deep and a tunnel 3,000 feet long, and 7,691 feet of work was done in 1926, chiefly in drifting on the vein. The company's annual report contains the following paragraphs:

> Development work has proceeded along the lines of our prearranged development campaign, and John A. Burgess * * * was retained during the summer to make a careful geological study of the property. * * *
>
> The downward continuation of the Estella ore body is now being traced by a drift from the "Wet Raise" (connecting the Getchell tunnel with the 150 level). When its position is definitely located, crosscutting to the north from the Getchell tunnel will locate it on this level.
>
> Good prospects are being followed on the fifth level, winze level, 150 level, and 260 level. The Getchell tunnel has been advanced to over the 3,000-foot point, and several small veinlets containing some ore have been cut. * * *
>
> A survey is being made of the Lewis Canyon side of the properties. This canyon cuts very deeply through the mountains to the far southeastern end of the properties. It was on this side that numerous mines were profitably worked in the early days, and it is toward the properties developed by these workings that the Getchell tunnel is to be driven.

Reese River district.—One car of silver ore was shipped from the Hardy mine of the Austin Manhattan Consolidated Silver Mines, but no development work was done and the 100-ton concentration mill was idle.

Skookum district.—One car of silver ore containing gold was shipped by lessees from the Gweenah claim, 10 miles west of Austin.

LINCOLN COUNTY

The mine production of metals in Lincoln County in 1926 was valued at $1,436,478, a decrease of $76,189 from 1925. Twelve mines produced 69,096 tons of ore and old tailings, an increase of 5,598 tons, but the output of lead, zinc, and gold decreased considerably. There was a good increase in the output of copper, and a small increase in the quantity of silver but a decrease in its value.

More than half the output was lead-zinc ore from the property of the Combined Metals Reduction Co., near Pioche.

Caliente (Chief) district.—A little oxidized lead ore was shipped from the Lucky Chief group, 9 miles north of Caliente.

Comet district.—Lessees shipped a small test lot of silver-lead ore from the Mountain Lion property.

Fairview district.—About 1,200 feet of development work was done at the Fairview mine of the Nevada Lead Co.

Ferguson (Delamar) district.—The old Delamar mine was under lease, and a little gold material was shipped as a result of a clean-up around the mill.

Groom district.—About 200 feet of development work was done at the Groom mine, north of Las Vegas, and several cars of silver-lead ore were shipped to Utah for smelting.

Jack Rabbit district.—The output of the Jack Rabbit district consisted of nearly 10,000 tons of oxidized copper-lead ore from the property of the Bristol Silver Mines Co. The ore contains considerable silver and a little gold, the total metals recovered in 1926 being valued at $259,368. About 700 feet of development was done in drifts and shaft sinking, new ore was opened early in the year, and a new power plant constructed. Manganiferous ore was shipped from the Black Metals mine to a steel plant.

Pahranagat district (Hiko).—A small lot of oxidized copper-lead ore containing silver was shipped from the Rosie claim, the post office of which is Hiko.

Pioche district.—Five lode mines in the Pioche district produced 59,018 tons of ore and old tailings, yielding $17,047 in gold, 290,761 ounces of silver, 70,115 pounds of copper, 4,840,298 pounds of lead, and 7,517,040 pounds of zinc, valued in all at $1,159,300, or $19.64 in metals a ton, and there were only three other mining districts in Nevada that produced metals valued at more than $1,000,000 in 1926. The output consisted of 14,403 tons of first-class smelting ore, 675 tons of old tailings smelted, and 43,940 tons of milling ore that was reduced to 13,654 tons of concentrates. The district was by far the largest producer of zinc in Nevada in 1926, as a result of the ore mined from the Panaca group by the Combined Metals Reduction Co. About 40,000 tons of lead-zinc ore containing considerable silver were shipped to Bauer, Utah, where it was treated by flotation; the resulting concentrates were shipped to the lead plant at International, Utah, the electrolytic plant at Great Falls, Mont., and various zinc smelters. The company shipped from Pioche weekly about 800 tons of mill ore said to average 0.04 ounce of gold and 6 ounces of silver to the ton, 6.2 per cent of lead, 15.5 per cent of zinc, and 20 per cent of iron. A section of the plant at Bauer was designed to leach silver-lead concentrate in an acid brine from which it was planned to recover lead chloride and pig lead, but in 1926 all the lead concentrate from the Nevada ore and from the Honorine (Utah) ore was shipped to International, Utah, for smelting. The mill was fully described in an article published in 1926.[2]

The Prince Consolidated Mining Co., the property of which is opened by a shaft 830 feet deep, did much development work and produced several thousand tons of iron-manganese fluxing ore containing gold, silver, and lead. A little lead-zinc ore was shipped to Utah for custom milling. Nearly 6,000 tons of iron-manganese flux were also shipped from the Virginia Louise property, leased to the Prince Consolidated Mining Co. The material contains about 3 ounces of silver to the ton and nearly 3 per cent of lead. Several hundred tons of old tailings from the Prince Consolidated dump were shipped to Utah by a lessee. The Fortuna group was operated under a lease and produced one car of first-class lead ore.

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[2] Robie, E. H., "Selective flotation at Bauer, Utah": Eng. and Min. Jour.-Press, Mar. 6, 1926, vol. 121, p. 405.

LYON COUNTY

In 1926 the quantity and value of each of the metals produced in Lyon County increased considerably. The increase in copper was natural, as the Mason Valley Mines Co. again became a large producer of copper ore. The total value of the metal output of the county increased from $24,945 in 1925 to $824,283 in 1926, and the copper yield increased more than 5,000,000 pounds.

Ramsey district.—The Ramsey Comstock property was operated a short time by the Ramsey Comstock Trust Co., and about 300 tons of rich gold ore was shipped from Appian on the Southern Pacific Railroad. It was reported in May that some unusually rich ore had been opened. The property is equipped with a 40-ton amalgamation mill, but only a small quantity of gold bullion was marketed.

Silver City district (*Palmyra, Dayton, Como*).—Nine lode mines in the Silver City district produced 32,944 tons of ore and old tailings, yielding $20,558 in gold, 31,524 ounces of silver, and 7,100 pounds of copper, valued in all at $41,223. The most interesting work in the district was that of the Dayton Syndicate (Inc.), which treated Douglas tailings at Dayton. The capacity of the mill was increased from 100 to 300 tons a day. The flotation concentrate from the Fuerman pneumatic cell is dried in ponds and then retorted for the recovery of quicksilver, the calcines being shipped for smelting. One hundred flasks of quicksilver used in the old mills on the Comstock Lode were recovered and sold in 1926. About 400,000 tons of old tailings remain for treatment. Gold ore of good grade was mined at the Oest mine by lessees and treated in the McTigue mill, a custom plant using amalgamation. Ore of lower grade from the Gilbest property was also shipped for milling, and a little first-class ore was shipped to the Mason Valley smelter; the property is owned by the Comstock Fracture Mining Co. A little gold was also recovered by amalgamation from the Black Hawk and Como properties. Lessees in the vicinity of Silver City shipped gold ore to the McTigue custom mill, and the current tailings from this plant, with certain old tailings, were re-treated at the Donovan cyanide plant.

Talapoosa district.—One small lot of rich gold ore containing considerable silver was shipped by a lessee from the Talapoosa property, 35 miles east of Reno.

Yerington district.—The chief output of the Yerington district was copper recovered from ore shipped from the Mason Valley and Bluestone properties, owned by the Mason Valley Mines Co. Nearly 3,000 feet of development was done during the year, and the flotation plant, which has a capacity of 1,000 tons a day, was operated regularly from February 27. Flotation concentrate, crude copper ore, and custom ore from Nevada and California were treated at the smelter at Thompson, which is equipped with two blast furnaces, two converters, and a Dwight-Lloyd sintering machine. Only one furnace and one converter were used in 1926. This is the first time the smelting plant has been in operation since 1919, and, as market conditions were not entirely favorable in 1926 for profitable operations, the company reported a deficit of $87,701 for the year. An article[3] published in January described the general conditions at the property. The following notes are taken from the printed report of the Mason Valley Mines Co. for 1926:

> Actual mine production and ore haulage commenced February 27, 1926, when the first section of the concentrator was placed in operation. The smelter was started August 10, 1926. * * *
>
> Haulage of sulphide ore from the Mason Valley group to the concentrator was commenced May 14, 1926, and the property has produced 48,083 tons during the year.
>
> Development work done consisted of 759 feet of raises and 664 feet of drifts, a total of 1,423 feet.
>
> The main haulage tunnel was advanced 265 feet, of which 70 feet were through a good grade of sulphide ore. * * *
>
> The actual production and delivery of ore from the Bluestone group commenced February 15, 1926, and for the year 168,748 tons of ore were mined and trammed to the mill and carbonate ore pockets.
>
> The total development for the year amounted to 1,349 linear feet. It consisted of 939 feet of raises and 410 feet of drifts and crosscuts. * * * The work of stripping the carbonate ore and overburden from certain areas of the sulphide ore was continued. * * *
>
> The total tonnage removed by stripping was 34,363 tons, of which 26,863 tons were carbonate ore which was shipped to the smelter and 7,500 tons were sent as waste to the dump.
>
> It will be necessary to remove by stripping another 100,000 tons to complete this work. It is estimated that one-fourth of this tonnage will be carbonate ore for shipment to the smelter. * * *
>
> The mine was operated entirely by open-cut methods and is in excellent condition. It has produced its ore at a very low mining cost. * * *
>
> From February 27 to May 5, 1926, only the first section of the concentrator was in operation. Since that time both sections have been operated.
>
> During the first few months of the operation of both units considerable mechanical difficulty was encountered, which resulted in curtailing the capacity of the concentrator and adversely affecting recovery. In addition to this, the ores milled contained an abnormal amount of oxidized copper which further decreased the recovery. * * *
>
> Numerous minor changes and improvements were made in both mill and crushing plant, which resulted in reaching a capacity of 1,000 tons per day before the end of the year. Plans are now under way and the work will soon be completed whereby the Callow cells will be changed to an improved type at a small capital expense. This will increase the mill capacity to an average of 1,250 tons per day and should result in reduction of milling costs and increase in metal recovery. * * *
>
> During four and three-quarter months the smelter was in operation 65,929 dry tons of marginal ore and concentrates were smelted.
>
> From the above tonnage there were produced 5,075.082 ounces of gold, 111,027 ounces of silver, and 5,938,360 pounds of copper.

The Nevada Douglas property, at Ludwig, was worked by lessees, and several hundred tons of copper ore were shipped to Thompson for smelting.

MINERAL COUNTY

The large increase in the output of lead and zinc in 1926 from the property of the Simon Silver-Lead Mines (Inc.) resulted in an increase of $63,931 in the value of the metals recovered in Mineral County. The output of copper, lead, and zinc increased, but there were large decreases in the gold and silver output. Forty-one mines produced 40,410 tons of ore and old tailings, an increase of 6,503 tons; most of the output was ore of milling grade, and a large part of it was lead-zinc ore.

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[3] Young, G. J., "Reconstruction and improvements at Mason Valley, Nev.": Eng. and Min. Jour.-Press, Jan. 9, 1926, vol. 121, p. 44.

Bell district (*Mina*).—The Simon Silver-Lead Mines (Inc.) did development work most of the year and operated its 250-ton flotation plant from August to December. Lead concentrate was shipped to Midvale, Utah, for smelting, and zinc concentrate was shipped to the Pacific coast for export to Belgium. The company reports a large quantity of silver-lead-zinc ore in reserve and gives the following notes in its printed report for 1926:

> The property of the company now consists of 20 patented mining claims, 8 unpatented claims, which have been obtained through purchase during the past year from the Consolidated West Extension Simon Mines Co., and 7 unpatented claims which were acquired by location. * * *
>
> During the month of July the plant was prepared for milling operations and a few additions made to secure operating economies.
>
> * * * Extensive improvements were made in reconditioning the mine and mill, preparatory to the resumption of operations. * * * After starting the mill on August 20 it was soon brought up to full capacity. * * *
>
> During the past year the main three-compartment shaft was sunk from the 700-foot level to the 800-foot level, and, in addition, there was driven 2,294 feet of drifts and crosscuts and 836 feet of raises. * * * The mineralization in the Simon mine covers a large area, and ore is found in almost every part of the mine, but in many places, as is characteristic of ore bodies in limestone replacement deposits, ore occurs in irregular bodies along exceedingly irregular contacts of rhyolite intruded into the limestone. * * *
>
> A review of the milling operations, covering 160 days, from August 20, 1926, to January 31, 1927, shows that there was hoisted during the period 29,990 tons, or 187.4 tons a day, of which 2,450 tons was sorted out as waste and 27,542 tons of ore milled, a daily average of 172 tons per day * * * having an average assay of 2½ ounces of silver per ton, 4 per cent of lead, and 4.85 per cent of zinc. From the total tons milled we obtained 1,648 tons of lead concentrate assaying 31.52 ounces of silver per ton, 57.44 per cent of lead, and 8.17 per cent of zinc, and 1,509 tons of zinc concentrate assaying 5 ounces of silver per ton, 4 per cent of lead, and 46.4 per cent of zinc. The gross value of the concentrate produced was $214,552.54. The net value or net revenue from the sale of this concentrate to the smelter was $150,800.94. The total operating cost (including development, royalties, and hauling) for the period was $202,133.83, leaving a total loss resulting from the 160 days' milling operations of $51,332.89. * * *

A test sample of lead ore was shipped from the Moonshine group, which is being developed.

Buena Vista district.—One lot of silver ore was shipped from the R. & S. claim by way of Queen station on the Southern Pacific Railroad.

Columbus district.—The large cyanidation plant of the New Candelaria Mines Co. was idle, but two cars of silver ore from the company's Badger property were shipped to the Mason Valley plant at Thompson. In 1924 and 1925 the company was a large producer of silver.

Garfield district.—Several hundred tons of ore, partly silver ore and partly oxidized lead ore containing considerable silver, were shipped by lessees from the Garfield property. The Mabel mine of the West End Consolidated Mining Co. also produced several hundred tons of lead ore, containing considerable gold and silver, which were hauled to Mina and shipped to a smelting plant in Utah.

Hawthorne and Pamlico districts.—Four lode mines in the Hawthorne district produced 18,549 tons of ore, yielding $560 in gold, 103,473 ounces of silver, 7,958 pounds of copper, and 142,195 pounds of lead, valued in all at $77,616, or $4.18 in metals a ton. A little oxidized lead ore was shipped from the Alberta group of the Hamlin Development Co. and from the Sunset mine, but the largest output of the district was lead ore from the Lucky Boy property, operated by the Hawthorne Mines (Inc.). A 200-ton concentration-flotation plant ran part of the year, but the company had difficulty obtaining sufficient water, and the mill was closed in September. Lead concentrate containing considerable silver was shipped to Midvale, Utah, for smelting. A little gold ore was treated by amalgamation at the Pamlico & La Panta property, where there is said to be a large tonnage of low-grade gold ore in the mine dumps.

Pine Grove district.—A small lot of gold ore was shipped from the Amie property at Pine Grove, 27 miles south of Yerington. Several hundred tons of old tailings, originally from the Wheeler dump, were concentrated, and the resulting gold concentrate was shipped to the Mason Valley smelter.

Rand district.—Four lode mines in the Rand district produced 477 tons of ore, yielding $5,172 in gold, 4,650 ounces of silver, and 26,141 pounds of copper, valued in all at $11,734, or $24.60 in metals a ton. The Copper Mountain Mines Syndicate, owning the Copper Mountain property, shipped several cars of sulphide copper ore to the Mason Valley plant at Thompson. The Nevada Rand Mines Co., east of Nolan on the Southern Pacific Railroad, shipped about 200 tons of gold and silver ore for smelting and a little siliceous ore for treatment at a custom cyanidation plant. The Gold Pen property produced two cars of rich gold ore of smelting grade.

Regent district (Rawhide).—Twelve lode mines in the Regent district produced 120 tons of ore, yielding $1,941 in gold, 2,648 ounces of silver, and 19,470 pounds of lead, valued in all at $5,151, or $42.93 in metals a ton. Lessees working the property of the Nevada New Mines, formerly a large producer, shipped a small lot of gold and silver ore for smelting and a little ore for treatment by cyanidation at Millers. One car of lead ore was shipped from the Lambert property, gold ore from the Skookum, Fitzgerald, Silver Trail, Murphy, Patsy V, and Morning Star properties, and several cars of silver ore from the Mascot, Proskey Regent, and Corrine claims.

Silver Star district (Marietta, Black Mountain).—Eight lode mines in the Silver Star district produced 333 tons of ore, yielding $5,511 in gold, 10,651 ounces of silver, 6,502 pounds of copper, and 30,885 pounds of lead, valued in all at $15,538, or $46.66 in metals a ton. With the exception of 88 tons treated in gold and silver mills, the output was first-class smelting ore. Work at the Endowment group was interrupted by cloudbursts, but several cars of copper-lead ore, with one lot of silver ore, were shipped by lessees to the sampler at Hazen; a small flotation mill is planned. A little gold ore was treated by amalgamation at the Triumph and Tonopah groups, gold ore was shipped for smelting from the Sunnyside and Banner properties, and a test lot of lead ore was shipped from the London Silver-Lead mine. The Nevada Douglas Gold Mines (Inc.) is said to have much gold ore developed 8 miles southwest of Mina, but the company was still financing the completion of the cyanidation plant late in the year. The output of the Redeemer mine, near Pepper Spring, consisted of free gold ore, part of which was treated by cyanidation and the remainder shipped for smelting.

Sodaville district (Pilot Mountains).—The Kismet mine, west of Pilot Mountain, produced a small test lot of oxidized copper ore.

NYE COUNTY

The total value of the mine production of metals in Nye County decreased from $3,086,441 in 1925 to $1,929,482 in 1926; this was the largest county decrease in the State and was due chiefly to a decrease of 1,157,107 ounces in silver. There was a large decrease in the output of gold and small increases in copper and lead. Fifty-one lode mines produced 138,784 tons of ore, a decrease of 66,411 tons. Most of the output, or 109,476 tons, was ore treated by cyanidation. The value of the placer production increased from $46,321 in 1925 to $51,969 in 1926; most of it came from claims at Round Mountain. Shipments of bullion decreased from practically all the large silver producers at Tonopah, and especially from the property of the Tonopah Extension Mining Co.

Antelope Springs district.—Two small lots of silver ore were shipped from the Antelope group, owned by the Gilbert International Mines Corporation, 50 miles southeast of Tonopah near the Cactus Range.

Bellehellen district.—Several hundred tons of siliceous gold and silver ore from the Clifford-Bellehellen property were hauled 35 miles to Tonopah, where it was treated in a custom cyanidation plant. The property has considerable ore in reserve and was being equipped with a 60-ton milling plant early in 1927.

Bullfrog district.—Several cars of silver ore were shipped from Beatty by the Beatty Consolidated Mines Co., and a little ore from the Reorganized Pioneer property was treated by amalgamation. The ore reserves are not published, but the property has a large dump of low-grade gold tailings.

Cloverdale or Golden district.—A small quantity of gold ore from the Dunn property was treated by amalgamation, and the resulting bullion was shipped to the assay office at Carson City.

Fairplay or Goldyke district.—One car of sulphide copper ore from the Copper King mine was shipped for smelting, and a little rich gold ore from the Gold Boy property was treated by amalgamation.

Hannapah district.—While prospecting at the Silver Leaf & Daisy property a little silver ore was shipped, part of which was milled at Tonopah and part marketed for smelting.

Johnnie district.—About 400 feet of drifting and sinking was done at the Johnnie mine, and a little gold ore was treated in the 16-stamp amalgamation mill; the shipping point is Death Valley, Calif., on the Tonopah & Tidewater Railroad.

Mammoth, Lodi, or Quartz Mountain district.—Five lode mines in the Mammoth district produced 3,083 tons of ore, yielding metals valued at $110,242. Several small lots of lead ore were shipped from the Downeyville, Gloria-Montezuma, and other claims in the district, but the largest part of the output was sulphide lead ore containing gold and silver from the Quartz Mountain mine, owned by the San Rafael Development Co. The company did extensive development work, amounting to 2,759 feet, and developed more than 10,000 tons of shipping ore. Shipments, however, did not begin until April, as the company was busy retimbering and straightening the shaft and installing heavier machinery. Drifting was done on the 350 and 450 foot levels, and a new strike of rich silver-lead ore was reported in the Lease vein. As a result of the opening of this deposit, a mild mining boom developed at Quartz Mountain and the price of mining claims rose proportionately. The Gloria-Montezuma group, 1½ miles southeast of the San Rafael mine, was taken over by the West Mines Corporation.

Manhattan district.—Six placers and eleven lode mines in the Manhattan district produced 920 tons of ore, $35,111 in gold, and 6,081 ounces of silver, valued together at $38,905. The ore had an average value of $34.39 in metals a ton. Most of the ore was treated in gold and silver mills, but 150 tons were shipped for smelting. The placer output consisted of $7,154 in gold and 175 ounces of silver, valued together at $7,263. The Keystone Divide Mining Co. operated the Blaker-Sloan property and shipped gold ore to Tonopah for treatment by cyanidation. Most of the output was taken out during development work, of which 700 feet was done in drifts and crosscuts. The roasting and cyanidation plant at the White Caps property was idle, but extensive prospecting was done in ore which contains realgar, orpiment, stibnite, and pyrite. In December the opening of rich gold ore on the lowest level was reported. Several cars of first-class ore containing considerable gold were shipped to the Mason Valley smelter. The printed report of the White Caps Gold Mining Co. for 1926 gives the following notes:

> There was acquired by purchase the unpatented J. M. D. lode mining claim. This makes the total acreage of mining claims owned by the company approximately 192 acres.
>
> The mine operations were concentrated in sinking the inclined shaft below the 1,220-foot level and prosecuting lateral exploration work on the 1,310-foot level.
>
> Much trouble was experienced in sinking this shaft, on account of numerous faults appearing as shaft sinking progressed. This made the ground surrounding the shaft unusually heavy, making it necessary to closely retimber so as to keep the shaft in operating condition.
>
> On the 1,310-foot level an ore body was found southwest from the shaft. A crosscut was run through it for a distance of 34 feet. The ore coming from this crosscut averaged about $50 per ton. Further work proved that this ore body pitched to the north, whereas all other ore bodies found on the upper levels pitched to the south, and, further, that its top, or apex, was at this level. It, therefore, had no connection with the ore bodies exposed on the 1,220-foot level. * * *
>
> Work done during the year also indicated that the west ore body developed from the surface to the 500-foot level (where it was cut off by a fault) should be found in unexplored territory on the 800-foot level. * * *
>
> No estimate of ore reserves is possible on account of the erratic nature of the ore bodies.

Gold ore from the Jumbo, Jumping Jack, Crescent, Midas, April Fool, Verden, and various claims operated by lessees was treated by amalgamation, chiefly at the War Eagle mill. The largest part of the placer output was recovered from the Arizona claims by drift mining; the remainder came chiefly from the African, Gold Nugget, and Dexter No. 14 claims.

Pan Cake district.—A sample lot of ore containing gold and silver was shipped from the High Tower prospect.

Reveille district.—A small lot of silver ore from the Cascade prospect was treated at Tonopah by cyanidation, and two small lots of exceptionally rich silver ore containing gold were shipped from the Halloween mine to smelters in Utah.

Round Mountain district.—Two placers and three lode mines in the Round Mountain district produced 25,029 tons of ore, $160,129 in gold, and 4,751 ounces of silver, valued together at $163,093. The ore had an average value of $4.73 in metals a ton. The output of both placers and lode mines was chiefly that of the Round Mountain Mines Co., a reorganization of the Round Mountain Mining Co.

The placer property is equipped with six hydraulic giants, but the company seldom operates more than two; about 65,000 yards of gravel was treated by hydraulicking in 1926. The lode property was worked by lessees and also on company account, and as a result of the work at the 150-ton amalgamation mill, considerable bullion containing gold and silver was shipped to California. The property is 60 miles from Tonopah, the shipping point, and has been a large producer of gold, both lode and placer, since 1907.

San Antone district (*Royston*).—Several lots of oxidized lead ore rich in silver were shipped from the Hudson property to the lead plant at Midvale, Utah. The property is opened by an inclined shaft 500 feet deep; it was operated for a time under lease by the Western Leadfield Mining Co., but this lease was relinquished early in 1927. One lot of copper ore from the Richfield mine was also shipped for smelting.

Stonewall district.—Development work was continued by the Lucky Tiger Consolidated Mining Co., but no ore was sold.

Tonopah district.—Nine lode mines on the Nye County side of the Tonopah district produced 108,978 tons of ore, yielding chiefly gold and silver; the total value of the metals was $1,572,968, or $14.43 to the ton. The dividends paid to stockholders in 1926 were paid by the Tonopah Mining Co. and amounted to $150,000. The total output of the district, part of which lies in Esmeralda County, follows:

Mine production of gold, silver, copper, and lead in the Tonopah district, Esmeralda and Nye Counties, Nev., 1925–26, and total, 1904–1926

Year	Mines producing	Ore	Gold	Silver	Copper	Lead	Total value
		Short tons		*Fine ounces*	*Pounds*	*Pounds*	
1925	13	197, 409	$683, 623	3, 070, 409			$2, 814, 487
1926	12	127, 252	454, 067	2, 052, 956	62		1, 735, 120
Total, 1904–1926		7, 764, 151	33, 674, 675	153, 672, 958	12, 175	214, 523	137, 300, 416

The Tonopah Belmont Development Co. was the largest producer of gold and silver in the district, although its 500-ton cyanidation plant at Tonopah was idle. The property is opened by two vertical shafts 1,718 and 1,127 feet deep and by more than 240,000 feet of other work. In 1926 the company did 2,823 feet of work in crosscuts, drifts, raises, and winzes. According to the printed report of the company, the mine produced 27,851 dry tons of ore, containing 6,958.56 ounces of gold and 657,546 ounces of silver, valued at $544,994. The ore was treated at the Millers plant of the Tonopah Mining Co., averaged 0.25 ounce of gold and 23.61 ounces of silver to the ton, and was valued at $19.57 a ton for both metals. The total net operating cost per ton of ore was $17.19, or a total profit of $2.38 a ton. Taxes and insurance on the Tonopah mill amounted to $0.17 a ton of ore shipped, leaving a net profit of $2.21 a ton. In all, 240,412 feet, or 45.53 miles, of development work has been done in the Belmont mine. The company's annual report to stockholders contains the following paragraphs:

> The net earnings from the operation of the Belmont mine during 1926, after deducting $4,887 for taxes and insurance on the Tonopah mill, were $61,493, as compared with $53,621 in 1925. * * *

The operating policy followed since March 1, 1926, has been to give considerable attention to the study and mining of the smaller veins and stringers of ore, as the larger ore bodies were already mined out; and particularly was attention given to the production of as clean a shipping product as was possible by means of close sorting of the waste from the broken ore. During the year this resulted in 38.8 per cent of the material, as broken in the stopes, being sorted out for waste. * * *

The continued lowering of the selling price of silver made the operation of the mine more and more difficult, and the sudden and extensive drop in price which took place in September necessitated a considerable reduction in the number of men employed and a reorganization of the entire mine and surface crews in order to operate at a profit. * * *

Development work has been carried on in the Belmont mine throughout the year under a restricted and conservative policy by the means of long-distance or prospect drills, followed, when commercial ore was indicated, by ordinary drifts, crosscuts, or raises. * * *

The production from stopes discovered by prospect-drilling operations amounted to 4,980 tons of ore, having a gross value of $104,580.

The Tonopah Mining Co. of Nevada operated its mine at Tonopah and its 400-ton cyanidation plant at Millers the entire year and did 3,614 feet of development work, which disclosed considerable $20 silver ore. The mill operated partly on custom ore and treated 57,572 tons of ore, which yielded 15,404 ounces of gold and 1,343,509 ounces of silver. Most of this ore, 35,787 tons, was custom ore delivered to the mill for treatment; the remainder, 21,785 tons, came from the company's property at Tonopah. The mill recovery was 95.4 per cent of the gold and 92.4 per cent of the silver. Dividends paid to stockholders amounted to $150,000, or a total of $16,425,000 to date, but all the earnings were not from Nevada, as the company operated mining property in other States, Canada, and Mexico. The net earnings and income from all sources in 1926 amounted to $263,064. After deducting dividends and $46,811 for various expenditures for exploration and development work, the company had a surplus of $2,627,995.

The Tonopah Extension Mining Co. operated a 60-stamp 500-ton cyanidation plant and treated 54,728 tons of ore from its property at Tonopah; part of this property is in Esmeralda County. It is opened by various drifts and crosscuts from a vertical shaft 2,000 feet deep, and 8,574 feet of work was done in drifts, crosscuts, and raises from the Victor, McKane, and West Tonopah shafts during the fiscal year ended March 31, 1927. Reserves are not published because of the erratic occurrence of the ore. The chief minerals are argentite, proustite, pyrargyrite, and gold in quartz. During the fiscal year the company treated 51,587 tons of ore, containing 541,589 ounces of silver, or an average of 10.50 ounces to the ton, and 5,133.65 ounces of gold, or an average of 0.10 ounce to the ton. The total amount received from sales of 500,920 ounces of silver and 4,864.01 ounces of gold recovered was $398,064, or $7.716 a ton of ore. The cost of mining, including all development, was $11.764 a ton; milling, $3.682; and marketing, including refining, express, and freight, $0.163—a total cost of $15.61 a ton. With the metal loss in tailing of $0.576 and the cost of depreciation, etc., amounting to $2.443 a ton, the total cost was $18.63 a ton. As the average gross value of the milling ore and miscellaneous income was only $8.48, the net loss per ton was $10.15. The total net loss for the year was $548,190, after making deductions for depreciation of plant and equipment but not for depletion. Consequently no dividends were distributed in 1926, although the company paid $3,927,221 in dividends from 1905 to 1925. The report says:

> The output was but little more than half the precious-metal production of last year, which in turn was itself considerably below normal. The price received for silver was also considerably lower, averaging $0.5939 per ounce as compared with $0.6930 in the previous year.
>
> Certain questions are still unsettled with reference to income taxes for previous years. The depletion deductible for tax purposes is now the subject of adjustment with the Government, and, pending a final determination thereof, no depletion figures for the current year are included in the accounts herewith submitted. * * *
>
> The area of mining property owned by the company remains the same, namely, 1,148.057 acres. * * *
>
> From results of work done during the past year there is further reason for believing that the downward extension of ore bodies, in the vicinity of the Victor shaft and below the present lowest workings, will be found farther west; but the development of these ore bodies can not be undertaken with safety until the water level in this territory has been materially lowered. Pumping is now and has been in progress to accomplish this. * * *
>
> On account of this condition and the limited ore supply remaining in these workings, a new ore supply had to be found and at an elevation where an excessive flow of water would not be developed; therefore, work was concentrated on the 1,540-foot level and west of the McKane shaft, in the hope of finding an adequate ore supply so that the company could again operate at a profit. If this could be accomplished, then at some future time work could be resumed westward from the lower levels of the Victor shaft. * * *
>
> Attempts were made to develop through the Victor shaft the territory west of the main Murray vein ore shoot on the 1,880 and 2,000 foot levels, but this work had to be temporarily discontinued, as the danger of developing an excessive flow of water was too great.
>
> Work in the McKane shaft was concentrated in exploring the 1,540-foot level and west of this shaft. To date three veins have been found—the Bermuda, Merten, and Paymaster—and the chances of developing others are favorable.
>
> The first named was found in an unfavorable rock formation for the existence of large ore bodies, although a material tonnage of ore has been and will be mined from it.
>
> The second, the Merten vein, is a vein of major importance and will, no doubt, in the future produce a material tonnage of ore. To date an ore shoot 295 feet in length has been developed with an average width of 6 feet or better; and the face of the west drift is now in another ore shoot the extent of which has still to be determined. * * *
>
> On the 1,100-foot level on the West Tonopah shaft a crosscut was run south for a distance of 548 feet, in which crosscut small stringers of ore were found. Work from this shaft was temporarily discontinued, as this territory could be more economically developed by working westward on the 1,540-foot level from the McKane shaft.
>
> In general it can be stated that conditions in the mine west of the McKane shaft and on the 1,540-foot level have shown a gradual but distinct improvement during the last few months.

There was a marked decrease in the gold and silver recovered from the West End Consolidated property, as there was in general at Tonopah, but the 275-ton cyanidation plant was operated the entire year and 3,000 feet of development work accomplished. The mine produced 18,338 tons of milling ore, containing 3,432.12 ounces of gold and 327,682 ounces of silver, having a gross value of $262,933, or $14.34 a ton. This ore was treated in the company's cyanidation plant, which treated a total, including custom ore, of 28,875 tons of ore from which 6,050 ounces of gold and 520,730 ounces of silver were recovered. The West End Consolidated Mining Co. is also interested in the Tonopah "76" and West End Extension companies in Esmeralda County and owns the Mabel mine in Mineral County. Ore from the Tonopah properties was treated in the West End mill. No dividends were paid in 1926.

The Rescue Eula Mining Co. did 1,178 feet of crosscutting and drifting and also drilled 1,100 feet of deep holes with a prospecting drill. Several cars of silver ore, containing chiefly argentite and stephanite, were shipped to the custom cyanidation plants at Tonopah and Millers.

Other producers in the district were the North Star, MacNamara, and Halifax Tonopah mines. About 800 feet of drifting was done at the Monarch-Pittsburg property, but no ore was shipped or treated.

Troy district (*Nyala*).—The output of the Troy district consisted of a few sample lots of lead ore from the Evans mine.

Tybo district.—One lot of silver-lead ore from a property near Tybo was hauled 65 miles to Tonopah for shipment to a smelter in Utah.

Union district (*Ione*).—The Shamrock Mines Co., near Ione, shipped one car of rich silver ore by way of Austin on the Nevada Central Railroad. A little gold ore from the Clipper and Jessie claims was treated locally by amalgamation.

ORMSBY COUNTY

A small lot of bullion from a prospect in the Delaware district was shipped to the assay office at Carson City. At the Comstock Triumph property much work was done in retimbering the shaft, running 800 feet of drifts, and constructing a 25-ton concentration plant. Reserves are estimated at 100,000 tons of silver-lead ore valued at $15 a ton.

PERSHING COUNTY

In Pershing County 26 lode mines produced 1,341 tons of ore and old tailings in 1926, a decrease of 7,912 tons from 1925. The total value of the metal output (lode and placer) decreased $51,127, from $95,844 in 1925 to $44,717 in 1926, as a result of the large decrease in the output of gold and silver; increases were shown in the output of lead and copper. The placer production was valued at $966. The idleness of the Rochester Silver Corporation caused a decided decrease in the output of silver.

Antelope district.—Three lode mines in the Antelope district produced 220 tons of ore, yielding $464 in gold, 6,502 ounces of silver, 3,252 pounds of copper, and 79,188 pounds of lead, valued in all at $11,311, or $51.41 in metals a ton. All the output was first-class ore shipped to Thompson, Nev., or Midvale, Utah, for smelting. Two cars of oxidized lead ore containing considerable copper and silver were shipped from Jungo by a lessee working the Emma mine, owned by the Antelope Springs Mining Co. The property is opened by a tunnel 1,150 feet long. No development work was done, and the lease was forfeited in 1926. Two cars of silver-lead ore were shipped from the Nevada Superior group and some low-grade ore containing gold and silver from the Arsenic King property.

Arabia district (*Oreana*).—Three lode mines in the Arabia district produced 323 tons of ore, yielding $551 in gold, 6,299 ounces of silver, 286 pounds of copper, and 120,898 pounds of lead, valued in all at $14,194, or $43.94 in metals a ton. The output was chiefly oxidized lead ore, containing silver and considerable antimony, from the Electric group and from the property of the Pershing County Mines Co. The chief mineral is bindheimite, and the ore averages about 20 ounces of silver to the ton, 18 per cent of lead, 18 per cent of silica, and 18 per cent of antimony. A small lot of lead ore was also shipped from the Lead Fraction prospect.

Central district (*Mill City*).—A small test lot of lead ore was shipped from the Gilbert claim in the Eugene Mountains, 12 miles northwest of Mill City.

Imlay district.—A small test lot of gold ore containing considerable silver was shipped from the Golden Spike property to Thompson.

Jersey Valley district.—While prospecting the Jersey Valley claim a small lot of low-grade lead ore was shipped for smelting.

Kennedy district.—One small lot of rich silver ore was shipped from the Fourth of July property, where several thousand tons of low-grade material is reported in the mine dumps. The property is 60 miles from Winnemucca and has no milling plant.

Mandalay district.—A little tunnel work was done at the Index claim, and some gold ore was treated by amalgamation.

Rochester district.—Two placers and seven lode mines in the Rochester district produced 484 tons of ore, $9,904 in gold, 3,737 ounces of silver, 478 pounds of copper, and 9,263 pounds of lead, valued in all at $13,044. The ore had an average value of $25.38 in metals a ton. Of this ore, 140 tons were shipped for smelting and 344 tons were treated in gold and silver mills. The Nevada Packard and Rochester Silver properties, large producers of silver during the war period, were practically idle, but a little bullion and silver ore were shipped to California and Utah. The Osage Mining Co. and other lessees operated the Frances & Monumental group, shipped first-class smelting ore, and treated a little gold ore in a small amalgamation plant. The Golden Age or Smith-Gilbert property also produced some gold ore taken out by lessees. The Lincoln mine of the Great Western Mines Co. of Nevada was worked a short time by lessees, and gold bullion was shipped to the mint at San Francisco, Calif. Small lots of lead ore and gold bullion were also shipped from the Buck & Charley property.

Rosebud district.—Sample lots of rich gold ore were shipped from the Surprise and Brown Palace claims near Sulphur.

Sacramento district.—A little gold was recovered from the Walker placer claims in Limerick Canyon.

San Jacinto district.—The Super Metal Syndicate did some prospecting on claims 19 miles from Oreana and shipped one lot of silver-lead ore.

Seven Troughs district.—The Seven Troughs Monarch Mining Co. reported a little development at the Hero group and the shipment of one small lot of gold ore.

Sierra (*Sunshine, Chafey, Dun Glen*) *district.*—The White Bear Syndicate, operating the Black Hole & Mayflower property near Mill City, spent six months in development work and the remainder of the year in mill building.

Spring Valley district.—The Thunderbolt claim near Lovelock produced one lot of free-milling gold ore.

Unionville district (*Buena Vista*).—The Arizona mine, formerly a producer of considerable silver, was not operated during 1926, but a little bullion was marketed from the treatment of old tailings.

STOREY COUNTY

Comstock district.—The entire production of Storey County was that of the Comstock district, where 18 lode mines produced 481,767 tons of ore and old tailings, yielding $1,181,277 in gold, 1,534,116 ounces of silver, and 3,390 pounds of copper, valued in all at $2,139,041, or $4.44 in metals a ton. This district was the largest producer of gold in the State, and the total value of its metal output was second only to that of the Robinson (Ely) district in White Pine County; it exceeded that of the Tonopah district. With the exception of 83 tons of first-class smelting ore, 50 tons of ore concentrated, and 6,025 tons of old tailings, the product was low-grade milling ore treated chiefly by cyanidation. Bullion shipped from the district contained 56,396.23 ounces of gold and 1,520,878 ounces of silver.

The Comstock Merger Mines (Inc.) operated its 1,500-ton concentration-cyanidation plant until December 15, when the property was closed. The company has been a large producer of gold and silver since September, 1922; the material treated has been low-grade ore, and no dividend payments have resulted from operations despite the fact that the mine has been the largest gold producer in Nevada since 1923, and was the largest silver producer in 1926 and the second largest from 1923 to 1925. Early in 1927 the machinery of the large cyanidation plant was sold and moved. The following summary of conditions at the property was published in the Nevada Mining Press, issue of December 10, 1926:

> Since the Comstock Merger Mines (Inc.) purchased the United Comstock mill and the Gold Hill mines, the mill has treated 970,000 tons of ore of an average value of $4.30 per ton, making an extraction of 90 per cent and recovering gold and silver to the amount of $4,103,000. The company has milled around 1,200 tons per day until recently, when the output dropped to 850 tons. Production of the United Comstock Mines Co. from the Gold Hill mines was 1,000,000 tons, making a total recovery by both companies of about $7,500,000 in four years and four months, almost entirely from stope fills.
>
> The big cyanide mill on American Flat was completed and started operating September 20, 1922.
>
> Extensive exploratory work was done by the Comstock Merger, especially in the area of the Crown Point-Belcher bonanza at the south end of Gold Hill, but neither new ore nor profitable stope fills were opened. The ore reserves of the mines are not exhausted, and it is probable that operations would have been continued for many months to come had silver remained around 65 cents per ounce. The sudden drop in the price of this metal wiped out most of the profit, and, as the prospect of silver regaining former price levels appeared to be unpromising, the directors voted to quit. Actual operating costs are said to have been less than half the average value of the ore, but most of the profit was spent in exploratory work. * * *
>
> The mill had a rated capacity of 60,000 tons per month but never milled more than 1,700 or 1,800 tons per day. The plant consisted of the most modern machinery obtainable and employed both concentration and the continuous decantation process of cyanidation. Mill machinery alone is said to have cost $850,000 without reckoning installation, and cost of mine and mill equipment exceeded $1,000,000.

The Berry and Lady Bryan mines were operated 10 months by the Flowery Mines Co. The 100-ton cyanidation plant treated 48,500 tons of ore, from which gold and silver valued at $162,570 were recovered. No development work was reported, and no statement was made regarding the reserves of low-grade ore.

A 50-ton flotation mill was operated part of the year on about 6,000 tons of old tailings from the Butters' dump. Gold and silver concentrate was shipped to Thompson for smelting. As in the past, lessees mined several hundred tons of ore from the Silver Hill property; this ore was treated by amalgamation, and the resulting tailings were hauled to the Donovan cyanidation plant. The Spearhead Gold Mining Co. produced low-grade gold ore, which was treated by amalgamation and concentration. The remainder of the output came from the Overland, Comstock Home, Comstock Tunnel & Drainage, Justice, Consolidated Virginia, Stuart Comstock, and Arrowhead properties, and from old dumps operated by lessees.

WASHOE COUNTY

The quantity and value of each of the metals except zinc decreased in 1926 in Washoe County. The total value of the metals decreased from $216,658 in 1925 to $38,401 in 1926, due chiefly to the burning of the mill of the Leadville Mines Co. in September, 1925.

Leadville district.—A few hundred tons of lead-zinc milling ore were shipped by lessees from the Leadville property near Gerlach. The mine was a large producer of silver-lead ore from 1921 to 1925, but no work has been done by the company since the mill was burned in 1925.

Peavine district.—A small lot of silver ore containing considerable gold was shipped from the Gold Bond prospect to the Mason Valley smelter.

Washoe district.—A little gold ore from the Harris mine at Washoe was treated by amalgamation.

West Comstock district.—The Bargo & Pandora property of the West Comstock Gold Mines Co. was not regularly operated, but a little gold bullion was recovered by amalgamation.

White Horse district.—Eight lode mines in the White Horse district produced 210 tons of ore, yielding $12,305 in gold and 224 ounces of silver, valued together at $12,445, or $59.26 a ton. All the output was gold ore treated by amalgamation in the Effrick mill, which was used for custom work. The largest part of the output was rich gold ore mined from the Renegade property by lessees. Other producers were the Green Hill, Renegade Extension, Grubstake, Springfield, Texas, Olinghouse No. 1, and Cabin No. 1 claims. Extensive development was done on the Buena Suerta claim of the Stud Mining Co., and ore was being mined by lessees early in 1927.

WHITE PINE COUNTY

In 1926 the total value of the mine production of metals in White Pine County increased $2,110,662 over 1925, due to the large increase in the output of copper from the property of the Nevada Consolidated Copper Co. The total yield of copper in the county increased more than 16,000,000 pounds and prevented a serious decrease in the value of the metal output of the State. There was an increase in the output of gold and in the quantity of silver, but decreases in lead and zinc. Twenty-nine lode mines produced 4,680,501 tons of ore and old tailings—an increase of 753,181 tons; most of the output was low-grade copper ore of milling grade.

Aurum or Silver Mountain district.—Several cars of lead ore and concentrate were shipped by the Muncy Lead-Silver Mining Co. The product was hauled 32 miles to Ray Spur on the Nevada Northern Railway.

Cherry Creek district (*Egan Canyon*).—One lot of gold-silver ore was shipped from the Star mine of the Cherry Silver Mining Co. to Utah for smelting.

Duck Creek district.—Seven lode mines in the Duck Creek district produced 194 tons of ore, yielding 458 ounces of silver, 69 pounds of copper, and 215,809 pounds of lead, valued in all at $17,560, or $90.52 in metals a ton. The output consisted of sulphide ore averaging about 60 per cent of lead from the Ely Amalgamated, Ely Gibraltar, Carbonate Lead, Gisborne, High Spy, Frederick, and Brennan properties. At the Ely Gibraltar property, worked through a tunnel 1,100 feet long, considerable concentrating lead ore was opened.

Eagle or Regan district.—A little lead ore from the Dandy mine of the Red Hills group was shipped to Midvale, Utah.

Granite district (*Steptoe*).—The Cuba mine, under lease, produced two cars of first-class lead ore, which was shipped from Warm Springs on the Nevada Northern Railway.

Osceola district.—Placer gold was recovered from claims near Osceola. At the Crescent group the Woodman Mining Co., which owns a five-stamp mill, did 1,000 feet of development. At the American property a tunnel was driven 875 feet.

Piermont district.—The Ely Calumet Mining Corporation did a large amount of work in ore containing chiefly silver. Reserves of 45,000 tons of 16-ounce silver ore are exposed.

Robinson district (*Ely*).—Seven lode mines in the Robinson district produced a greatly increased quantity of ore, which was chiefly milling product from the Nevada Consolidated property. The district was the largest producer of copper in Nevada in 1926 and was second only to the Comstock district in the production of gold. The general increase in the output of the district is indicated in the table following:

Mine production of gold, silver, copper, lead, and zinc in the Robinson district, White Pine County, Nev., 1925–26, and total, 1904–1926

Year	Mines producing	Ore	Gold	Silver	Copper [1]	Lead	Zinc	Total value
		Short tons		*Fine ounces*	*Pounds*	*Pounds*	*Pounds*	
1925	6	3,922,770	$734,064	126,720	78,627,308	221,531	207,226	$12,022,108
1926	7	4,672,240	751,863	144,092	95,009,115	363,428	51,900	14,176,018
Total, 1904–1926		53,551,987	9,071,239	1,583,177	1,179,320,199	3,881,375	6,060,421	214,405,611

[1] Includes copper saved from precipitates recovered from mine water.

The mines and reduction plants of the Nevada Consolidated Copper Co. were operated continuously during 1926. The Copper Flat property was being developed for underground mining after surface steam-shovel work had been done for 19 years. A five-compartment shaft was sunk 711 feet during the year. The 15,000-ton concentration plant and 2,000-ton smelter at McGill treated ore from company mines as well as custom material. The ore is treated by tabling and flotation, and Forester cells were installed during the year. From the Nevada Consolidated property 2,860,660 dry tons of ore averaging about 1.30 per cent of copper was mined and milled. In addition, 1,499,469 dry tons of low-grade material removed by steam shovel in stripping operations was concentrated. The metal production is not given separately by the company but is combined with that of the Ray Consolidated Copper Co. at Ray, Ariz., and the Chino mine at Santa Rita, N. Mex.—both acquired by the Nevada Consolidated Copper Co. in May. The costs of operations, including all overhead expense except depreciation and Federal, State, and local taxes, were as follows: Stripping and mining concentrating ore by steam shovel, 44.86 cents a cubic yard of stripping and 19.04 cents a ton of ore, compared with 45.02 cents and 20.14 cents, respectively, in 1925; mining concentrating ores from the underground porphyry area of the Ruth mine, 96.3 cents a ton in 1926, compared with 85.3 cents in 1925 and 96.9 cents in 1924; milling, 48.3 cents per ton of ore treated. The following paragraphs are from the company's annual report:

> At Nevada mines 16,596 feet of prospect drilling was completed during the year for the principal purpose of defining more clearly, both laterally and in depth, the ore to be mined by underground methods. This drilling resulted in proving existence and value of considerable new tonnage of normal grade and a very large tonnage of a lower yet commercial grade ore. * * *
>
> A five-compartment shaft, sunk to a depth of 711 feet, is designed to accommodate the mining of all the known ore bodies in the Copper Flat group not found amenable to power-shovel mining. Two pockets are being constructed at appropriate horizons in this shaft, the lower of which will serve the areas first to be mined and is now 50 per cent completed. A total of 1,527 feet of haulage way has been driven on this lower level. All foundations for the permanent surface equipment for this shaft were completed and ready for the steel structures by the end of the year. The steel gallows frame was 50 per cent erected, and the hoist house and shop buildings completed. Development at the Ruth shaft consisted of continuing the preparation of the seventh level in anticipation of the gradual exhaustion of the mining areas on the sixth level above. Thirty-five railroad ore cars of 80 tons capacity were received and put in service. * * *
>
> The concentrator at McGill was completed to an economical capacity above 15,000 tons of ore per day when treating average grade ore. * * *
>
> At the smelting plant some minor improvements were effected during the year, which tended to increase the unit capacity of the roasters and reverberatories, and, as a result, it was found possible to treat the total smelting tonnage in two reverberatory furnaces, except for short periods when three were operated. * * * In addition to the treatment of concentrates produced in milling operations, a total of 92,878 tons of ore from company mines and 10,156 tons of custom ores were smelted direct. * * *
>
> At the Nevada property an increasing tonnage of ore will be produced from underground sources in future years, chiefly from the operations through the new Wedge shaft, from which will be mined all the ore lying beneath or outside of power-shovel areas in the Copper Flat section. This shaft will come into service in a limited way during the year 1927.

The Consolidated Coppermines Corporation, owning the Brooks, Ora, and Richard properties near Kimberly, was idle most of the year, but a contract was made with the Nevada Consolidated Copper Co. for the treatment of ore in August, after which the property was a large producer of copper ore. Besides the first-class copper ore shipped for smelting and the low-grade copper ore (the chief product) shipped for milling, the company disposed of some lead ore and lead-zinc ore that was either smelted or milled at International, Utah. The copper ore of both milling and shipping grade—218,298 tons—yielded 6,135,018 pounds of copper, 2,835.96 ounces of gold, and 8,366 ounces of silver. In addition to the ore milled or smelted locally, lessees shipped 681 dry tons of ore, containing 74.56 ounces of gold, 19,068 ounces silver, 134,591 pounds of lead, and 61,021 pounds of zinc, to Utah for milling and smelting. The company's printed report for 1926 gives the following paragraphs:

> A comprehensive agreement was signed with the Nevada Consolidated Copper Co., extending for approximately the now known lives of both companies, and providing for the mining and treatment of certain of our ores and the mining by us of certain ores of the Nevada Co. * * * Six months' operations indicate that a practical and mutually advantageous agreement has been made.
>
> As each company owns part of the thick and expensive Ruth and Liberty Pit ore bodies, it was necessary to agree on working plans in order that ores near the boundaries can be economically mined.
>
> The Nevada Co., having large milling and smelting capacity, can readily and economically treat our ores. * * *
>
> The corporation owns, in the Robinson mining district, 190 patented mining claims and 8 unpatented mining claims, comprising 2,987.3 acres. * * *
>
> On June 24, 1926, the Nevada Consolidated Copper Co. resumed ore extraction by steam-shovel operations on the corporation's Ora claim under the contract agreement. * * * Active operations were resumed at Kimberly mines during the latter part of August, and small shipments were started from the Richard mine in September and have continued throughout the year. * * *
>
> Exploration and development work for the year consisted of 1,762 feet of work chiefly in drifts and raises.
>
> The Richard mine was reopened during the latter part of August, and decision was made to complete the mining of the high-grade sulphide ore body, of which an estimated tonnage of 18,000 tons of ore, averaging 3.25 per cent of copper remained. Production for the year from this body has been over 10,000 tons, averaging 4.18 per cent of copper. * * * The present estimate indicates that 45,000 tons of ore remain, after the extraction of the 18,000 tons above estimated. * * *
>
> The development work for the year in the Richard oxide ore body totaled 371 feet, and it is planned to mine 56,000 tons of 4.25 per cent oxide ore. * * *
>
> The developments as planned and now under way in the Morris and Brooks mines will prepare about 1,000,000 tons of ore at an estimated grade of 1.41 per cent for mining.
>
> A five-compartment shaft 7½ feet wide by 32 feet long, outside dimensions, was started on the Emma Nevada claim and advanced 63 feet. This shaft will be used for the extraction of the corporation's porphyry ores which adjoin the Nevada Consolidated Copper Co.'s Liberty pit. Ores of the Nevada Consolidated Co. will also be produced from this shaft under provision of the contract with the Nevada Consolidated Copper Co.

Several cars of copper ore were shipped from the Boston-Ely property by lessees, and considerable lead ore was shipped from the Graham group of the Silver Age Mining Co. The Hidden Treasure property, which is actually a copper mine, produced several cars of silver-lead ore, which occurs near the contact of limestone and porphyry. A car of oxidized lead ore was also shipped from the Hone claim in Robinson Canyon, 3 miles west of Ely.

Ward district (*Taylor*).—The Paymaster mine, owned by the Nevada United Mines Co., produced several cars of oxidized lead ore which was shipped by lessees to International, Utah. The mine was a large producer in 1923 and 1924, but was idle most of 1926.

White Pine district (*Hamilton*).—Nine lode mines in the White Pine district produced 6,537 tons of ore and old tailings, yielding $372 in gold, 17,892 ounces of silver, 19,069 pounds of copper, and 549,809 pounds of lead, valued in all at $58,192, or $8.90 in metals a ton. With the exception of 519 tons of first-class ore smelted and 1,440 tons of old tailings treated by cyanidation, the output was concentrating ore. Vigorous work was done at the Nevada Belmont property by the Tonopah Belmont Development Co. More than 2,500 feet of work in drifts, crosscuts, and raises disclosed silver-lead ore, which was treated in the 50-ton concentration plant. A flotation unit was added, but the recovery was not satisfactory. The property is about 60 miles from Ely on the Nevada Northern Railway. The mill was operated from August 27 to the end of the year. Notes from the printed report of the Tonopah Belmont Development Co. for 1926 follow:

> In the Nevada No. 1 tunnel a total of 285 feet of new development work was done during the year, and of this 160 feet was in ore of good grade.
>
> In the Nevada No. 5 level 110 feet of new development work was done during the year, and of this 50 feet was in ore. * * *
>
> In February a mill was designed to treat 50 tons of ore per day, and construction was started in April. An aerial tramway 9,200 feet long was built from the Cornell portal of the mine to the mill. * * *
>
> The mill began operating on August 27, but it was found that the ore was much more difficult to treat than had been expected. * * * A small flotation unit was then installed, but the results obtained were still very poor, and the mill was closed December 31.

Several cars of oxidized copper-lead ore were shipped from the Great Valley mine, and lead ore was shipped from the Nevada Bell, Rocco Homestake, McEllin, and Roosevelt properties. During the summer months old tailings from the Treasure Hill dump, 5 miles south of Hamilton, were treated in a 30-ton cyanidation plant, and silver bullion was shipped to a refinery in California.

COPPER

By C. E. JULIHN and HELENA M. MEYER [1]

INTRODUCTION

It is less true than formerly that the production of copper requires three operations—mining, smelting, and refining. All copper must be mined; but for years some Lake Superior copper has been smelted and sold as Lake copper without subsequent refining, and a steadily increasing amount of copper is being extracted from ores by leaching methods, which render smelting unnecessary. Nevertheless, it is still practicable to determine the copper production of the United States by three distinct sets of statistics which may be obtained, respectively, from the mines, the smelters, and the refineries.

These separate determinations of production are desirable because each of them has for certain purposes a particular advantage over the others. As they show different aspects of production, the three sets of figures will never agree exactly, but, taken together, they afford complete data on the output of copper.

Details of the geographic distribution of output are shown more precisely by statistics of mine production than by those of smelter and refinery production. Likewise, the character of the ores produced, their contents of copper and other valuable metals, and the treatment, other than smelting, they may have undergone can be learned accurately only from the mines themselves. On the other hand, mine statistics show only the estimated recoverable metal content of the ores.

The actual percentage of crude copper recovered from copper ores, and from other ores having a low content of copper, is shown by the smelter statistics. Lead and zinc ores, siliceous ores of the precious metals, and pyrite roasted in the manufacture of sulphuric acid often carry so little copper that the mines are not paid for it and do not report it, though these sources as a whole yield a considerable amount of copper. Another cause of difference between the figures of mine and of smelter production is the lag in time between the production and the smelting of an ore. For example, most of the ore mined in December of any year is not represented in the figures of smelter production for that year but enters into the figures of the year following. A third cause of difference between these two sets of figures is that the amount of metal contained in ore, matte, and other material held in stock at smelters is rarely the same at the beginning and the end of a year. Smelter statistics, as well as mine statistics, show broadly the geographic distribution of output.

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[1] Figures on imports and exports were compiled by J. A. Dorsey, of the Bureau of Mines, from records of the Bureau of Foreign and Domestic Commerce.

The precise amount of copper made available for consumption in a given period, as well as that of the precious metals recovered from crude copper, is shown only by refinery statistics; but these afford little information on the distribution of output according to source and are uncertain even in their classification of the material refined as foreign or domestic.

Differences between smelter and refinery statistics are similar in origin to those existing between mine and smelter statistics, for some time after the copper is smelted must elapse before it is refined, and the quantity of copper in stocks of untreated or unfinished material at the beginning of the year differs from that at the end, not only at smelters but at the refineries as well.

Two or three months usually elapse between the day ore is mined and the day the copper derived from it becomes available for commercial use. Hence, the refinery statistics for the calendar year 1926 represent approximately the ore mined between October, 1925, and October, 1926. In periods when the course of production is little disturbed by pronounced fluctuations of activity, the three sets of statistics should not differ greatly; but any decided fall or rise in production between October of one year and March of the year following tends to accentuate the differences among the three sets of figures.

In these reports the smelter output, including that of furnace-refined Lake copper as well as blister copper, has been adopted as the production of the country because smelter figures permit reasonably accurate determination of the distribution of copper production by States and give also the actual output of copper.

In order to have these figures maintain their value for showing the output of the country, it is necessary to include in them some copper produced directly through the leaching of ores and subsequent precipitation by electrolysis, although this fraction of the production is not actually smelted, as is the cement copper precipitated from solutions by means of scrap iron. Since this electrolytically precipitated copper is very pure, refineries merely resmelt it in order to cast it in commercial forms.

SUMMARY OF DOMESTIC AND WORLD STATISTICS

Summary of statistics of the copper industry in the United States, 1917–1926

	1917	1918	1919	1920	1921
Production of copper:					
Smelter output.......pounds..	1,886,120,721	1,908,533,595	1,286,419,329	1,209,061,040	505,586,098
Mine production........do....	1,895,434,349	1,910,022,841	1,212,334,041	1,224,550,151	466,190,853
Refinery production of new copper—					
Electrolytic........pounds..	1,452,744,593	1,560,327,422	1,233,994,324	1,010,240,867	506,532,984
Lake.................do....	268,508,091	231,096,158	177,594,135	153,483,952	100,918,001
Casting and pig.......do....	152,293,487	91,450,611	21,897,336	18,698,421	1,963,271
Total domestic........do....	1,873,546,171	1,882,874,191	1,433,485,795	1,182,423,240	609,414,256
Total domestic and foreign ....pounds..	2,421,794,213	2,394,297,521	1,770,168,041	1,526,165,346	950,777,815
Total new and old copper ....pounds..	3,189,000,000	3,100,000,000	2,345,000,000	2,151,000,000	1,385,000,000
Ore produced:					
Copper ore........short tons..	58,482,694	62,289,069	36,121,622	36,765,370	13,396,382
Average yield of copper ....per cent..	1.60	1.51	1.65	1.63	1.70
Copper-lead and copper-zinc ores.............short tons..	31,632	15,698	17,632	26,890	14,248
Average price per pound..cents..	27.3	24.7	18.6	18.4	12.9
Imports (unmanufactured) ....pounds..	556,420,297	575,805,115	429,387,594	485,670,691	350,472,611
Exports of metallic copper[1] ....pounds..	1,125,647,336	744,243,481	515,595,019	623,158,489	628,415,714
Withdrawn from total supply on domestic account:					
Total new copper....pounds..	1,394,829,715	1,661,669,576	914,471,572	1,053,838,558	610,988,744
Total new and old copper ....pounds..	2,162,000,000	2,367,000,000	1,489,000,000	1,679,000,000	1,046,000,000
Stocks at end of year:					
Refined copper..........do....	114,000,000	180,000,000	631,000,000	659,000,000	459,000,000
Blister and materials in solution..............pounds..	411,000,000	552,600,000	273,000,000	465,000,000	283,000,000
World's production (smelter) ....pounds..	3,150,583,000	3,148,531,000	2,191,394,000	2,114,349,000	1,229,277,000
Value of smelter production from domestic ores..................	$514,911,000	$471,408,000	$239,274,000	$222,467,000	$65,221,000

	1922	1923	1924	1925	1926
Production of copper:					
Smelter output.......pounds..	950,285,947	1,434,999,962	1,634,249,192	1,674,869,886	1,739,622,094
Mine production........do....	964,583,894	1,477,739,709	1,606,165,018	1,678,117,747	1,725,275,931
Refinery production of new copper—					
Electrolytic........pounds..	766,944,836	1,302,454,492	1,499,223,447	1,533,995,439	1,553,041,424
Lake.................do....	122,545,126	137,691,306	145,333,227	138,029,764	172,372,304
Casting...............do....	15,180,723	24,019,197	29,657,925	10,870,144	5,883,433
Total domestic........do....	904,670,685	1,464,164,995	1,674,214,599	1,682,895,347	1,731,297,161
Total domestic and foreign ....pounds..	1,255,515,959	1,979,835,616	2,260,076,010	2,204,573,824	2,322,485,376
Total new and old copper ....pounds..	1,927,000,000	2,802,000,000	3,037,000,000	3,045,000,000	3,282,000,000
Ore produced:					
Copper ore........short tons..	26,893,247	45,519,317	49,178,315	53,103,014	57,181,894
Average yield of copper ....per cent..	1.74	1.58	1.59	1.54	1.46
Copper-lead and copper-zinc ores.............short tons..	52,370	162,181	219,874	228,612	282,015
Average price per pound..cents..	13.5	14.7	13.1	14.2	14.0
Imports (unmanufactured) ....pounds..	541,013,220	676,473,338	768,813,731	652,971,407	779,441,803
Exports of metallic copper[1] ....pounds..	742,755,957	828,854,827	1,116,775,136	1,082,369,439	960,220,112
Withdrawn from total supply on domestic account:					
Total new copper....pounds..	896,633,833	1,300,473,331	1,354,742,564	1,401,012,091	1,570,136,207
Total new and old copper ....pounds..	1,568,000,000	2,122,000,000	2,131,000,000	2,241,000,000	2,530,000,000
Stocks at end of year:					
Refined copper..........do....	216,000,000	264,000,000	243,000,000	124,000,000	146,000,000
Blister and materials in solution..............pounds..	361,000,000	432,000,000	393,000,000	432,000,000	455,000,000
World's production (smelter) ....pounds..	1,904,793,000	2,683,025,000	2,985,058,000	3,090,880,000	3,192,293,000
Value of smelter production from domestic ores..................	$128,289,000	$210,945,000	$214,087,000	$237,832,000	$243,547,000

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[1] Total exports of copper, exclusive of ore, concentrates, and composition metal, and in 1923 to 1926 of unrefined copper, figures for which are not separable from those for ore and concentrates. In 1926 exclusive also of "Other manufactures of copper," for which figures of quantity are not recorded.

Copper produced in the United States from domestic ores, 1921–1926

[Smelter output, in pounds fine]

State	1921	1922	1923	1924	1925	1926
Alaska	76, 808, 114	59, 900, 579	68, 648, 368	77, 053, 492	72, 204, 166	67, 631, 846
Arizona	155, 165, 656	428, 200, 634	615, 493, 561	672, 365, 115	722, 653, 457	729, 324, 537
California	15, 906, 883	20, 440, 430	27, 042, 835	49, 433, 716	46, 943, 604	30, 442, 961
Colorado	6, 592, 598	3, 635, 916	4, 343, 418	4, 158, 612	3, 163, 211	4, 657, 591
Georgia		8, 147				
Idaho	1, 971, 623	3, 504, 944	3, 664, 079	3, 148, 519	3, 144, 064	1, 171, 262
Maine	3					
Michigan	100, 918, 001	122, 545, 126	137, 691, 306	145, 333, 227	138, 029, 764	174, 778, 884
Missouri	137, 591	1, 070, 259	217, 449	184, 947	12, 114	54, 378
Montana	49, 471, 206	165, 341, 414	224, 353, 764	249, 322, 394	270, 604, 676	257, 271, 936
Nevada	15, 129, 116	20, 398, 611	63, 495, 928	77, 281, 479	77, 137, 563	109, 041, 769
New Mexico	18, 076, 909	29, 127, 329	57, 521, 171	78, 145, 629	76, 467, 245	82, 848, 096
North Carolina			61, 913			1, 468, 746
Oregon	274, 934	925, 954	1, 182, 437	716, 656	126, 107	279, 223
Pennsylvania		888, 721	1, 121, 573	1, 263, 535	562, 240	495, 698
Tennessee	15, 084, 294	14, 226, 232	18, 721, 932	18, 251, 996	19, 789, 234	18, 601, 586
Texas	587	3, 889	4, 216	302	785	17, 102
Utah	45, 831, 959	79, 665, 563	210, 118, 291	256, 531, 349	242, 730, 986	259, 649, 158
Vermont						446, 323
Washington	598, 658	369, 133	839, 254	978, 647	1, 184, 807	1, 336, 617
Wyoming	9, 830		87, 686		331	
Undistributed	3, 608, 136	33, 066	390, 781	79, 577	115, 532	104, 381
	505, 586, 098	950, 285, 947	1, 434, 999, 962	1, 634, 249, 192	1, 674, 869, 886	1, 739, 622, 094

The accompanying table shows the world's smelter production of copper by countries where smelted but not necessarily where refined. So far as possible, material from scrap has been eliminated. As the figures for the United States do not include the smelter product from foreign ores, concentrates, and mattes, the content of the imports of these materials has been included in the total for the world, in so far as can be done without duplication of figures shown elsewhere in the table.

World's smelter production of copper, 1922–1926, in metric tons

[Compiled by L. M. Jones, of the Bureau of Mines]

Country [1]	1922	1923	1924	1925	1926
North America:					
Canada	14, 860	18, 877	24, 438	22, 180	(2)
Mexico	21, 225	39, 019	33, 359	33, 531	38, 708
United States [3]	431, 047	650, 912	741, 283	759, 708	789, 075
	467, 132	708, 808	799, 080	815, 419	(2)
South America:					
Chile	113, 344	162, 464	174, 496	176, 811	[4] 184, 024
Peru [5]	36, 408	44, 166	33, 938	36, 864	42, 940
	149, 752	206, 630	208, 434	213, 675	226, 964
Europe:					
Austria	4, 593	4, 833	3, 848	3, 779	3, 203
Belgium	7, 287	7, 910	8, 930	11, 140	10, 006
Czechoslovakia	175	152	301	34	348
France	2, 747	5, 628	2, 299	3, 420	3, 500
Germany [6]	32, 000	26, 200	34, 600	39, 100	46, 200
Great Britain [7]	18, 700	23, 200	21, 500	20, 700	17, 900
Italy		184	10	578	420
Norway	80	67	71	251	192
Rumania [8]	111	71	90	133	189

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[1] In addition to the countries listed, copper is smelted in Asiatic Turkey, but data of output are not available.

[2] Data not available.

[3] Smelter output from domestic material, exclusive of scrap. The production of refined copper from domestic and foreign material, exclusive of scrap, is reported as follows, in metric tons: 1922, 569,489 tons; 1923, 898,034 tons; 1924, 1,025,148 tons; 1925, 999,973 tons; 1926, 1,053,456 tons.

[4] Exports of copper bars.

[5] Includes copper contained in ores, concentrates, and mattes exported.

[6] Exclusive of material from scrap. (Metallgesellschaft, Stat. Zusammenstell.)

[7] Approximate production. (Min. Res. Dept., Imp. Inst.)

[8] Smelter output from domestic ores.

World's smelter production of copper, 1922–1926, in metric tons—Continued

Country	1922	1923	1924	1925	1926
Europe—Continued.					
Russia [9]	954	1,758	3,147	9,042	10,835
Spain	10,015	13,186	16,597	21,298	23,925
Sweden [10]	(11)	(11)	2,005	3,727	3,894
Yugoslavia	5,354	6,788	8,101	7,301	9,671
	82,016	89,977	101,499	120,503	130,283
Asia:					
China [12]	313	849	842	1,048	2,068
Chosen	2			418	766
India, British	1,054	190			
Japan	54,126	59,346	63,056	66,487	67,365
	55,495	60,385	63,898	67,953	70,199
Africa:					
Belgian Congo	43,362	57,886	85,570	90,104	80,639
Rhodesia—					
Northern	181	132	100	75	719
Southern	3,074	2,697	2,525	1,714	7
Union of South Africa	665	7,979	8,383	7,819	8,820
	47,282	68,694	96,578	99,712	90,185
Oceania:					
Australia	11,709	18,111	14,326	11,160	11,327
Papua [13]				89	173
	11,709	18,111	14,326	11,249	11,500
	[14] 864,000	[14] 1,217,000	[14] 1,354,000	[14] 1,402,000	[14] 1,448,000

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[9] Year ended Sept. 30.
[10] Exclusive of material from scrap.
[11] Total output from scrap. Production reported as follows: 1922, 61 tons; 1923, 119 tons.
[12] Exports of ingots and slabs.
[13] Copper content of blister exported in year ended June 30 of year stated.
[14] Includes copper content of ores, concentrates, and mattes imported into the United States not elsewhere included.

World's mine production of copper, 1922–1926, in metric tons

[Compiled by L. M. Jones, of the Bureau of Mines]

Country [1]	1922	1923	1924	1925	1926
North America:					
Canada	19,450	39,409	47,381	50,553	60,371
Cuba [2]	11,466	10,618	10,614	14,135	9,028
Mexico	26,978	53,372	50,062	54,596	56,200
Newfoundland		[3] 91	(4)	(5)	(5)
United States	437,526	670,288	728,540	761,177	782,568
	495,420	773,778	836,597	880,461	908,167
South America:					
Argentina [6]	500	300	300	300	300
Bolivia [3]	10,531	10,049	7,439	7,235	8,144
Chile	145,772	206,023	213,856	243,219	243,558
Peru	36,408	44,166	33,938	36,844	42,511
Venezuela	1,126	2,137	1,778	2,228	(5)
	194,337	262,675	257,311	289,826	297,000
Europe:					
Austria	1,197	1,684	1,941	1,840	2,238
Bulgaria [6]	1,000	1,000	1,000	1,000	1,700
Czechoslovakia	(7)	(7)	(7)	(7)	600
Finland	750	507	368	1,374	991
France	53	30	14	(5)	(5)
Germany	17,733	18,467	22,944	24,446	27,687

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[1] In addition to the countries listed, copper is produced in Asiatic Turkey, but data of output are not available.
[2] Copper content of ore, concentrates, and matte imported into the United States.
[3] Copper content of exports.
[4] Production of 9 tons of copper ore reported, content not stated.
[5] Data not available.
[6] Approximate production.
[7] The following quantities of copper ore reported produced in Czechoslovakia, content not stated: 1922, 2 tons; 1923, 172 tons; 1924, 590 tons; 1925, 3,606 tons.

World's mine production of copper, 1922–1926, in metric tons—Continued

Country	1922	1923	1924	1925	1926
Europe—Continued.					
Great Britain	106	89	123	97	110
Hungary	1	2	4	5	(5)
Italy	1,265	1,100	857	826	1,491
Norway	8,291	8,534	9,510	31,693	6,207
Portugal [6]	2,000	2,000	2,000	2,000	2,000
Rumania [8]	111	71	90	133	189
Russia [9]	478	1,984	3,312	5,426	11,636
Spain	28,026	33,409	26,291	71,831	49,726
Sweden	1,459	1,550	1,679	1,960	1,748
Yugoslavia	5,806	6,808	8,143	9,693	12,100
	68,276	77,235	78,276	152,324	118,423
Asia:					
China [10]	313	849	842	1,048	2,068
Cyprus	593	1,250	2,821	[3] 3,521	[3] 3,056
India, British	1,154	248	1,254	3,500	6,200
Japan—					
Japan proper [8]	54,126	59,346	63,056	66,487	67,365
Chosen [11]	(5)	(11)	(11)	(11)	(11)
Taiwan	1,096	707	946	689	1,717
	57,282	62,400	68,919	75,245	80,406
Africa:					
Algeria	429	458	560	468	489
Belgian Congo [8]	43,362	57,886	85,570	90,104	80,639
French Congo	219	113	291	(5)	(5)
Madagascar	------	(12)	------	(12)	------
Morocco, French	------	------	10	9	45
Rhodesia—					
Northern [8]	181	132	100	75	719
Southern [8]	3,074	2,697	2,565	1,714	7
Southwest African Protectorate	6,279	9,044	8,021	8,334	8,984
Tunisia	19	47	15	------	------
Union of South Africa [8]	665	7,979	8,383	7,819	8,820
	54,228	78,356	105,515	109,000	99,703
Oceania:					
Australia	12,703	17,997	14,807	12,007	8,862
New Caledonia	------	(13)	------	------	------
Papua [14]	148	(15)	2	528	1,686
	12,851	17,997	14,809	12,535	10,548
	883,000	1,273,000	1,362,000	1,519,000	1,514,000

[3] Copper content of exports.
[5] Data not available.
[6] Approximate production.
[8] Smelter product.
[9] Year ended Sept. 30.
[10] Exports of ingots and slabs.
[11] The following quantities of copper ore are reported produced in Chosen, content not stated: 1923, 65 tons; 1924, 654 tons; 1925, 1,011 tons; 1926, 1,723 tons. In addition, considerable quantities of cupriferous sulphide ores are produced.
[12] Exports of copper ore are reported as follows, content not stated: 1923, 9 tons; 1925, 3 tons.
[13] Production of 82 tons of copper ore reported, content not stated.
[14] Copper content of exports for year ended June 30 of year stated.
[15] Less than one-half ton (240 kilograms).

GENERAL CONDITIONS

In 1926 the major fundamentals of the world situation in regard to copper remained substantially the same as in the previous few years. These include abundant ore reserves, excess capacity for production, an expanding rate of consumption, and a recognized community of interest among producers that makes possible well-organized marketing at a low price, but nevertheless permits substantial profits for many producers.

The ore reserves of the Americas could take care of the world's requirements for some years to come, but to these have been added recently the large deposits of Africa of high average grade. Being now in course of development, with an ambitious program of production, the possible effect of the coming of copper from these new sources upon the price of copper, the profits of producers, and the stability of established agencies of production has undoubtedly been a psychological factor affecting the price of copper. It is probably of some advantage that this is the case, because higher prices would have decreased consumption, and continued expansion of consumption is especially helpful at present to high-cost and low-cost producers alike. For this reason it may be said that the mere passing of another year with substantial maintenance of the status quo is a matter of importance.

Regarding from various points of view the production figures of the past throws much light upon the effect of time upon the consumption of copper. Thus, for example, while the daily rate of copper production, as reported by the American Bureau of Metal Statistics, fluctuates considerably from month to month, the general trend, as determined by a moving average of such figures to a second approximation, shows that the increase for several years past can be represented as a straight line. The trend so calculated indicates an annual increase in production rate of 198 short tons per day. The normal daily rate for the middle of 1926 so indicated is 4,372 tons, although the actual rate in June and July, 1926, was only 4,189 and 4,030 tons, respectively. Since the rate for the middle of the year will also be the average rate for the whole year, 4,372 tons is taken as the starting point in the following table.

None of these figures are offered as predictions. It was thought that assembling the facts from the several aspects shown, by indicating to others the order of magnitude of past increases of production, might be helpful to them in drawing their own conclusions.

Forecast of world's copper production, in short tons, based on yearly increase of 72,270 tons, or average daily increase of 198 tons

Year	Average per day	Total for year	Year	Average per day	Total for year
1926 (assumed)	4, 372	1, 595, 780	1938	6, 748	2, 463, 020
1927	4, 570	1, 668, 050	1939	6, 946	2, 535, 290
1928	4, 768	1, 740, 320	1940	7, 144	2, 607, 560
1929	4, 966	1, 812, 590	1945	8, 134	2, 968, 910
1930	5, 164	1, 884, 860	1950	9, 124	3, 330, 260
1931	5, 362	1, 957, 130	1955	10, 114	3, 691, 610
1932	5, 560	2, 029, 400	1960	11, 104	4, 052, 960
1933	5, 758	2, 101, 670	1970	13, 084	4, 775, 660
1934	5, 956	2 173, 940	1980	15. 064	5, 498, 360
1935	6, 154	2, 246, 210	1990	17, 044	6, 221, 060
1936	6, 352	2, 318, 480	2000	19, 024	6, 943, 760
1937	6, 550	2, 390, 750			

These figures are extended to the end of the century, not because it is believed the world can ever produce copper at a rate anything like six or seven million tons a year but because none can tell at what point production must fail to meet demand as now determined by expanding needs of industry and low price made possible by large reserves and ample capacity for production.

The figures for the not-distant years, however, should be dependable as the minimum to be anticipated while the fundamentals of the copper industry continue substantially as at present, because production and consumption previous to their disturbance by the war had long progressed, not by an arithmetical increase, but by a pronounced geometrical increase, as shown by the following table:

World's copper production and rate of increase, 1881–1930, by five-year periods

Period	Production (short tons)		Per cent of increase	Period	Production (short tons)		Per cent of increase
	Total for period	Average per year			Total for period	Average per year	
1881–1885	1, 106, 000	221, 000	----------	1906–1910	4, 271, 000	854, 000	26. 9
1886–1890	1, 383, 000	277, 000	25. 3	1911–1915	5, 390, 000	1, 078, 000	26. 2
1891–1895	1, 726, 000	345, 000	24. 5	1916–1920	6, 821, 000	1, 364, 000	26. 5
1896–1900	2, 423, 000	485, 000	40. 6	1921–1925	5, 947, 000	1, 189, 000	[1] 12. 8
1901–1905	3, 364, 000	673, 000	38. 8	1926–1930	8, 702, 000	1, 740, 000	46. 3

[1] Decrease.

The figures for 1926 to 1930 in the preceding table have been obtained by using the actual production of 1926 and inserting as estimates for the subsequent four years their production as estimated in the table on page 565.

We find from this that the average of the increases for each five-year period in the 35 years previous to 1915 was 30 per cent; that, in spite of the set-back of 1919 to 1922, the corresponding average for the period 1915 to 1930 was 20 per cent; and that for the entire period since 1881, an average of 27 per cent per five-year period is shown. Continuance of world production at such rate of increase would result as follows:

	Short tons
1925 (actual)	1, 545, 000
1930	1, 962, 000
1935	2, 492, 000
1940	3, 165, 000
1950	5, 105, 000

While return to the former geometrical rate of increase is neither impossible nor improbable in the near future, it will be seen that it could not long persist, as diminishing reserves would materially increase the price and so cause readjustment of consumption demands to some new basis.

In order to complete the picture of world production upon a still broader basis, the following table of production by decades from the beginning of the nineteenth century is added, the last decade being completed from the estimates previously set up for its last four years:

World's copper production and rate of increase, 1801–1930, by 10-year periods

Period	Short tons [1]	Per cent of increase	Period	Short tons [1]	Per cent of increase
1801–1810	102, 000	----------	1871–1880	1, 332, 000	32. 1
1811–1820	108, 000	5. 9	1881–1890	2, 489, 000	86. 9
1821–1830	152, 000	40. 7	1891–1900	4, 149, 000	66. 7
1831–1840	244, 000	60. 5	1901–1910	7, 635, 000	84. 0
1841–1850	315, 000	29. 1	1911–1920	12, 211, 000	59. 9
1851–1860	567, 000	80. 0	1921–1930	14, 649, 000	20. 0
1861–1870	1, 008, 000	77. 8			

[1] Subsequent to 1881 the figures have been converted to short tons from those given in Mineral Resources of the United States. Previous figures converted from those of London Financial News, January, 1900, as quoted by Horace Stevens in Copper Handbook, 1900.

It is seen that from the beginning of the last century the average of decadal increases has exceeded 53 per cent and that, in spite of the recession at about the beginning of the present decade, the increase for 1921 to 1930 will probably amount to 20 per cent.

This prolonged course of increase is so impressive and its momentum is so great that little else could reasonably be expected but an early return of the curve of world production to a course similar to that previous to its disturbance by the war, because it represents the integration of a host of factors, among which no material changes are in evidence.

The properties of copper render that metal so useful to civilization and industry that the increase of population and of material betterment throughout the world must be expected to produce effects in the future comparable to those shown by the past, as long as abundant reserves and cheap production render a low price economic as in the past and at present.

Depletion of world reserves will ultimately result in increased price, curtailment of use, and diminishing consumption, but as yet no such state of affairs is imminent. Nevertheless, the time is relatively short until maintenance of the present rate of increase in consumption will become impossible; hence the importance of the passing of a year when many in the copper industry have been apprehensive over what, after all, amounts to only a moderate increase in world reserves.

In closing this discussion of general conditions it may be of interest to add the figures projecting into the immediate future the same increase per decade found in the preceding table. This would be:

	Short tons
1925 (actual)	1, 545, 000
1935	2, 373, 000
1945	3, 645, 000
1955	5, 599, 000

PRODUCTION

SMELTER PRODUCTION

The copper output of the United States smelters in 1926 from domestic ores exceeded the peace-time record output of 1925 by 4,752,208 pounds.

The domestic smelter output from ores of domestic origin repre-ented 56 per cent of the world's copper production in 1913, 61 per ent in 1918, 57 per cent in 1920, 41 per cent in 1921, 50 per cent in 922, 53 per cent in 1923, 55 per cent in 1924, and 54 per cent in 925 and 1926.

Copper produced (smelter output) in the United States, 1845–1926

[Values rounded]

Year	Quantity	Increase	Value	Year	Quantity	Increase	Value
	Pounds	*Pounds*			*Pounds*	*Pounds*	
1845	224, 000	----------	$45, 000	1887	181, 477, 331	23, 714, 288	$25, 044, 000
1846	336, 000	112, 000	57, 000	1888	226, 361, 466	45, 440, 942	38, 029, 000
1847	672, 000	336, 000	124, 000	1889	226, 775, 962	414, 496	30, 615, 000
1848	1, 120, 000	448, 000	218, 000	1890	259, 763, 092	32, 987, 130	40, 523, 000
1849	1, 568, 000	448, 000	349, 000	1891	284, 121, 764	24, 358, 672	36, 368. 000
1850	1, 456, 000	[1] 112, 000	320, 000	1892	344, 998, 679	60, 876, 915	40, 020, 000
1851	2, 016, 000	560, 000	334. 000	1893	329, 354, 398	[1] 15, 644, 281	35. 570, 000
1852	2, 464, 000	448, 000	542, 000	1894	354, 188, 374	24, 833, 976	33, 648, 000
1853	4, 480, 000	2, 016, 000	985, 000	1895	380, 613, 404	26, 425, 030	40, 726, 000
1854	5, 040, 000	560, 000	1, 108, 000	1896	460, 061, 430	79, 448, 026	49, 687, 000
1855	6, 720, 000	1, 680, 000	1, 814, 000	1897	494, 078, 274	34, 016, 844	59, 289, 000
1856	8, 960, 000	2, 240, 000	2, 419, 000	1898	526, 512, 987	32, 434, 713	65, 288, 000
1857	10, 752, 000	1, 792, 000	2, 688, 000	1899	568, 666, 921	42, 153, 934	97, 242, 000
1858	12, 320, 000	1, 568, 000	2, 833, 000	1900	606, 117, 166	37, 450, 245	100, 615, 000
1859	14, 112, 000	1, 792, 000	3, 104, 000	1901	602, 072, 519	[1] 4, 044, 647	100, 546, 000
1860	16, 128, 000	2, 016, 000	3, 709, 000	1902	659, 508, 644	57, 436, 125	80, 460, 000
1861	16, 800, 000	672, 000	3, 696, 000	1903	698, 044, 517	38, 535, 873	95, 632, 000
1862	21, 160, 000	4, 360, 000	4, 655, 000	1904	812, 537, 267	114, 492, 750	104, 005, 000
1863	19, 040. 000	[1] 2, 120, 000	6, 473, 000	1905	888, 784, 267	76, 247, 000	138, 650, 000
1864	17, 920, 000	[1] 1, 120, 000	8, 422, 000	1906	917, 805, 682	29, 021, 415	177, 136, 000
1865	19, 040, 000	1, 120, 000	7, 473, 000	1907	868, 996, 491	[1] 48, 809, 191	173, 799, 000
1866	19, 936, 000	896, 000	6, 828, 000	1908	942, 570, 721	73, 574, 230	124, 419, 000
1867	22, 400, 000	2, 464, 000	5. 682, 000	1909	1, 092, 951, 624	150, 380, 903	142, 084, 000
1868	25, 984, 000	3, 584, 000	5, 976, 000	1910	1, 080, 159, 509	[1] 12, 792, 115	137. 180, 000
1869	28, 000, 000	2, 016, 000	6, 790, 000	1911	1, 097, 232, 749	17, 073, 240	137, 154, 000
1870	28, 224, 000	224, 000	5, 977, 000	1912	1, 243, 268, 720	146, 035, 971	205, 139, 000
1871	29, 120, 000	896, 000	7, 023, 000	1913	1, 224, 484, 098	[1] 18, 784, 622	189, 795, 000
1872	28, 000, 000	[1] 1, 120, 000	9, 956, 000	1914	1, 150, 137, 192	[1] 74, 346, 906	152, 968, 000
1873	34, 720, 000	6, 720, 000	9, 721, 000	1915	1, 388, 009, 527	237, 872, 335	242, 902, 000
1874	39, 200, 000	4, 480, 000	8, 624, 000	1916	1, 927, 850, 548	539, 841, 021	474, 288, 000
1875	40, 320, 000	1, 120, 000	9, 152, 000	1917	1, 886, 120, 721	[1] 41, 729, 827	514, 911, 000
1876	42, 560, 000	2, 240, 000	8, 937, 000	1918	1, 908, 533, 595	22, 412, 874	471, 408, 000
1877	47, 040, 000	4, 480, 000	8, 937, 000	1919	1, 286, 419, 329	[1] 622, 114, 266	239, 274, 000
1878	48, 160, 000	1, 120, 000	7, 994, 000	1920	1, 209, 061, 040	[1] 77, 358, 289	222, 467, 000
1879	51, 520, 000	3, 360, 000	9, 582, 000	1921	505, 586, 098	[1] 703, 474, 942	65, 221, 000
1880	60, 480, 000	8, 960. 000	12, 943, 000	1922	950, 285, 947	444, 699, 849	128, 289, 000
1881	71, 680, 000	11, 200, 000	13, 046, 000	1923	1, 434, 999, 962	484, 714, 015	210, 945, 000
1882	90, 646, 232	18, 966, 232	17, 313, 000	1924	1, 634, 249, 192	199, 249, 230	214, 087, 000
1883	115, 526, 053	24, 879, 821	19, 062, 000	1925	1, 674, 869, 886	40, 620, 694	237, 832, 000
1884	144, 946. 653	29, 420, 600	18, 843, 000	1926	1. 739. 622, 094	64, 752, 208	243. 547, 000
1885	165, 875, 483	20, 928, 830	17. 915, 000				
1886	157, 763, 043	[1] 8, 112, 440	17, 512, 000		37, 541, 682, 651	----------	6, 195, 983, 000

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[1] Decrease

The figures of smelter production in 1926 are based on confidential returns from all known smelting companies handling copper-bearing materials from the United States. Sincere thanks are extended to all companies and officials who have aided in furnishing this information and have given valuable time to answering inquiries concerning distribution of the output. The following list gives the names of the owning or operating companies, the location, and the final copper product of smelting and refining plants treating material from the United States during 1926. It does not include lead and zinc plants that recovered copper as a by-product from mixed ores. Lists of lead and zinc smelters can be found in the chapters on those metals.

Copper-reduction plants that treated materials from the United States in 1926

Location	Company	Final copper product
Arizona:		
Ajo	New Cornelia Copper Co	Electrolytic.
Clarkdale	United Verde Copper Co	Blister.
Do	United Verde Extension Mining Co	Do.
Clifton	Phelps Dodge Corporation	Do.
Douglas	Calumet & Arizona Mining Co	Do.
Do	Phelps Dodge Corporation	Do.
Hayden	American Smelting & Refining Co	Do.
Humboldt	Southwest Metals Co	Do.
Inspiration	Inspiration Cons. Copper Co	Electrolytic.
Miami	International Smelting Co	Blister.
Superior	Magma Copper Co	Do.
California: Copperopolis	Calaveras Copper Co	Do.
Maryland: Baltimore	Baltimore Copper Smelting & Rolling Co	Electrolytic.
Michigan:		
Hancock	Quincy Mining Co	Anodes and Lake.
Houghton	Michigan Smelting Co	Do.
Hubbell	Calumet & Hecla Mining Co	Do.
Montana:		
Anaconda	Anaconda Copper Mining Co	Blister.
Great Falls	do	Electrolytic.
Nevada:		
McGill	Nevada Consolidated Copper Co	Blister.
Thompson	Mason Valley Mines Co	Do.
New Jersey:		
Chrome	United States Metals Refining Co	Blister, electrolytic, and casting.
Maurer	American Smelting & Refining Co	Do.
Newark	Balbach Smelting & Refining Co	Casting.
Perth Amboy	Raritan Copper Works	Electrolytic.
New York: Laurel Hill	Nichols Copper Co	Blister and electrolytic.
Tennessee:		
Copperhill	Tennessee Copper Co	Blister.
Isabella	Ducktown Chemical & Iron Co	Do.
Texas: El Paso	American Smelting & Refining Co	Do.
Utah:		
Garfield	Garfield Smelting Co	Do.
International	International Smelting Co	Do.
Virginia: West Norfolk	Norfolk Smelting Co	Do.
Washington: Tacoma	American Smelting & Refining Co	Blister and electrolytic.

During the year the copper smelting and refining plants shown above treated material from the United States; all of these were domestic plants. The figures of production represent the actual smelter recovery. For Michigan it is the sum of furnace-refined copper and copper cast into anodes for electrolytic refining. As to blister copper, the figures represent the fine copper content. Some casting and electrolytic copper is produced direct from ore or matte, and this is included in the smelter production. Metallic and cement copper recovered by leaching is also included in smelter production.

MINE PRODUCTION

The figures of mine production are based on reports furnished to the Bureau of Mines by all mines producing copper. The mines and smelters of several of the large copper producers are under the same management, and their production is reported on the same basis. The figures furnished by mines that ship to custom smelters or have only matting furnaces and ship their matte for conversion are likely to differ considerably from the smelter returns, as the mines may report a considerable quantity that has not reached the stage of blister copper by the end of the year and is consequently not included in the smelter production, or material that was reported by the mines in one year may be treated by the smelters in the following year. This discrepancy is more pronounced if a marked change in rate of production occurs at the beginning or the end of the year, so that there is not the balance of overlap that occurs if the industry is in normal condition throughout the year. Considerable copper is recovered by the smelters from ores that are treated primarily for other metals, the copper content being so low that it is not paid for and consequently is not always reported by the mines. The difference between the smelter and the refinery production is accounted for by change in the stocks of blister copper and bluestone, and the loss in refining.

Detailed figures on ore production in 1925 which were not available when the 1925 report on copper was prepared are included in this report.

Copper produced from domestic ores as reported by mines, smelters, and refineries, 1918–1926, in pounds

Year	Mine	Smelter	Refinery
1918	1, 910, 022, 841	1, 908, 533, 595	1, 882, 874, 191
1919	1, 212, 334, 041	1, 286, 419, 329	1, 433, 485, 795
1920	1, 224, 550, 151	1, 209, 061, 040	1, 182, 423, 240
1921	466, 190, 853	505, 586, 098	609, 414, 256
1922	964, 583, 894	950, 285, 947	904, 670, 685
1923	1, 477, 739, 709	1, 434, 999, 962	1, 464, 164, 995
1924	1, 606, 165, 018	1, 634, 249, 192	1, 674, 214, 599
1925	1, 678, 117, 747	1, 674, 869, 886	1, 682, 895, 347
1926	1, 725, 275, 931	1, 739, 622, 094	1, 731, 297, 161

PRODUCTION BY STATES

The mine and smelter production figures, by States, for 1925 and 1926 are shown in the table following; in the second table following the smelter production from 1845 through 1926, by States, is shown. Arizona, Utah, Montana, and Michigan lead in production for 1926 with 82 per cent of the smelter output. If the production of Nevada, New Mexico, and Alaska is added to the output of the States already mentioned, 97 per cent of the output of the country is represented. In total production from 1845 through 1926 Arizona, Montana, and Michigan are especially impressive, having made 31.08, 24.58, and 20.46 per cent, respectively, of the country's total output. Utah stands fourth with 9.21 per cent, and the four States together have produced 85 per cent of the total. If the production of Nevada, New Mexico, and Alaska is added to that of the above States, 94 per cent of the country's output is represented.

Copper produced in the United States, 1925 and 1926, according to smelter and mine returns, by States, in pounds

State	1925		1926			
	Smelter returns	Mine returns	Rank	Smelter returns		Mine returns
				Percentage of total	Quantity	
Alaska	72, 204, 166	73, 855, 298	7	3. 89	67, 631, 846	67, 778, 000
Arizona	722, 653, 457	713, 355, 129	1	41. 92	729, 324, 537	723, 296, 051
California	46, 943, 604	46, 864, 913	8	1. 75	30, 442, 961	33, 466, 299
Colorado	3, 163, 211	2, 360, 500	10	. 27	4, 657, 591	3, 403, 850
Idaho	3, 144, 064	3, 297, 443	13	. 07	1, 171, 262	1, 337, 442
Michigan	138, 029, 764	155, 157, 488	4	10. 05	174, 778, 884	175, 381, 565
Missouri	12, 114	12, 100	17		54, 378	1, 077, 000
Montana	270, 604, 676	268, 910, 847	3	14. 79	257, 271, 936	255, 372, 862
Nevada	77, 137, 563	79, 300, 224	5	6. 27	109, 041, 769	101, 827, 937
New Mexico	76, 467, 245	76, 427, 825	6	4. 76	82, 848, 096	81, 642, 379
North Carolina			11	. 08	1, 468, 746	1, 468, 700
Oregon	126, 107	106, 325	16	. 02	279, 223	296, 454
Pennsylvania	562, 240	1, 035, 824	14	. 03	495, 698	1, 018, 536
Tennessee	19, 789, 234	19, 788, 234	9	1. 07	18, 601, 586	18, 606, 664
Texas	785		18		17, 102	12, 620
Utah	242, 730, 986	236, 486, 540	2	14. 92	259, 649, 158	257, 464, 482
Vermont			15	. 02	446, 323	473, 200
Washington	1, 184, 807	1, 159, 057	12	. 08	1, 336, 617	1, 351, 890
Wyoming	331					
Undistributed	115, 532			. 01	104, 381	
	1, 674, 869, 886	1, 678, 117, 747		100. 00	1, 739, 622, 094	1, 725, 275, 931

Copper produced in the United States, 1845–1926, by States

[Smelter output]

State	Pounds	Percentage	Rank
Alaska	1, 020, 696, 035	2. 72	7
Arizona	11, 668, 963, 237	31. 08	1
California	970, 488, 599	2. 59	8
Colorado	310, 563, 934	. 83	10
Idaho	129, 083, 483	. 34	11
Michigan	7, 679, 756, 411	20. 46	3
Montana	9, 228, 288, 655	24. 58	2
Nevada	1, 304, 863, 784	3. 48	5
New Mexico	1, 040, 312, 865	2. 77	6
Oregon	18, 780, 271	. 05	14
Tennessee	[1] 488, 144, 000	1. 30	9
Utah	3, 457, 258, 308	9. 21	4
Washington	22, 403, 528	. 06	13
Wyoming	31, 673, 137	. 08	12
Other States and unapportioned	170, 406, 404	. 45	
	37, 541, 682, 651	100. 00	

[1] Approximate production.

Mine production of copper in the principal districts, 1925 and 1926

[Districts that produced over 1,000,000 pounds]

District or region	State	1925		1926	
		Mine output (pounds)	Percentage of total production	Mine output (pounds)	Percentage of total production
Butte	Montana	266,637,000	15.89	252,991,000	14.66
Bingham	Utah	227,612,000	13.56	248,975,000	14.43
Globe-Miami	Arizona	175,272,000	10.44	175,386,000	10.17
Lake Superior	Michigan	155,157,000	9.25	175,382,000	10.17
Yavapai County (mostly Jerome district).	Arizona	154,017,000	9.18	155,368,000	9.01
Bisbee (Warren)	do	145,433,000	8.67	140,668,000	8.15
Ely (Robinson)	Nevada	78,627,000	4.69	95,009,000	5.51
Ajo	Arizona	69,262,000	4.13	82,350,000	4.77
Central (including Santa Rita)	New Mexico	68,812,000	4.10	75,219,000	4.36
Ray (Mineral Creek)	Arizona	74,695,000	4.45	69,930,000	4.05
Copper River	Alaska	(1)	(1)	(1)	(1)
Morenci-Metcalf	Arizona	59,464,000	3.54	63,950,000	3.71
Pioneer	do	[2] 27,021,000	1.61	29,055,000	1.68
Plumas County	California	26,918,000	1.60	22,163,000	1.28
Ducktown	Tennessee	19,788,000	1.18	18,607,000	1.08
Yerington	Nevada	(3)		5,450,000	.32
Foothill belt	California	4,893,000	.29	5,241,000	.30
Tintic	Utah	4,627,000	.28	5,226,000	.30
Shasta County	California	14,551,000	.87	5,061,000	.29
Prince William Sound	Alaska	(1)	(1)	(1)	(1)
Lordsburg	New Mexico	5,064,000	.30	4,763,000	.28
Banner	Arizona	(3)		2,350,000	.14
Park City	Utah	2,466,000	.15	2,279,000	.13
Big Bug	Arizona	(3)		1,954,000	.11
Silver Bell	do	3,048,000	.18	1,828,000	.11
Montana	Montana	1,290,000	.08	1,639,000	.09
San Juan County	Colorado	1,502,000	.09	1,560,000	.09
Swain County	North Carolina			1,469,000	.09
Index	Washington	1,087,000	.06	1,348,000	.08
Pima	Arizona	2,408,000	.14	1,179,000	.07
Lebanon (Cornwall mine)	Pennsylvania	1,036,000	.06	1,019,000	.06
Alder Creek	Idaho	2,356,000	.14	(3)	
Burro Mountain	New Mexico	1,891,000	.11	(3)	

[1] Not at liberty to publish figures.
[2] As shown in company's annual report to stockholders.
[3] Less than 1,000,000 pounds.

Copper produced in some of the principal districts to the end of 1926

District or region	State	Date production began	Pounds	Per cent	Rank
Butte	Montana	1868	9,170,417,000	24.43	1
Lake Superior	Michigan	1845	7,658,391,000	20.40	2
Bisbee	Arizona	1880	3,455,825,000	9.21	3
Bingham	Utah	1896	3,085,658,000	8.22	4
Globe-Miami	Arizona	1881	2,607,876,000	6.95	5
Jerome	do	1883	(1)	(1)	6
Morenci-Metcalf	do	1873	1,721,468,000	4.59	7
Ely (Robinson)	Nevada	1908	1,162,124,000	3.10	8
Central (including Santa Rita)	New Mexico	1800	920,421,000	2.45	9
Ray (Mineral Creek)	Arizona	1911	887,272,000	2.36	10
Shasta County	California	1897	619,799,000	1.65	11
Ducktown	Tennessee	1850	488,247,000	1.30	12
Ajo	Arizona	(2)	[3] 448,924,000	1.20	13
Plumas County	California	1865	178,024,000	.47	14
Tintic	Utah	1880	172,606,000	.46	15
Foothill belt	California	1862	171,633,000	.46	16
Pioneer	Arizona	(2)	[4] 155,666,000	.41	17

[1] Bureau of Mines not at liberty to publish figures for Jerome district separately in 1924–1926. The total through 1923 was 1,556,324,000 pounds.
[2] Not recorded.
[3] From 1907–1926, inclusive.
[4] From 1904–1926, inclusive.

QUANTITY AND ESTIMATED RECOVERABLE CONTENT OF COPPER-BEARING ORES

For many years the general report on copper in Mineral Resources has contained a section on mine production of copper, including tables showing copper ore produced, copper ore concentrated, smelted, leached, etc. This copper chapter for 1926 is published with detailed ore figures for 1925 and 1926.

The following tables show the quantity and the estimated recoverable copper content of the ore produced by the mines of the United States in 1922 to 1926. The figures are taken from the mine reports in Mineral Resources. The close agreement between the output as reported by the smelters and the recoverable quantity as reported by the mines indicates that the estimated recoverable tenor is very close to the actual recovery. The classification of some of the complex western ores is difficult and more or less arbitrary. Under copper ores are classed not only those which contain 2.5 per cent or more of copper but those which contain less than this percentage if they are valuable chiefly for copper. Under copper-lead and copper-lead-zinc ores are classed complex ores in which copper is a valuable constituent. Mines report considerable copper from ores mined primarily for other metals. These include siliceous gold and silver ores, lead ores, zinc ores, pyritic sulphur ores, and ores concentrated for their content of other metals. No attempt has been made to compile tables showing the quantity and recoverable content of this group of copper-bearing ores, but with old slags and other materials they yielded a total of 40,799,908 pounds of copper in 1925 and 47,504,081 pounds in 1926.

Copper produced in the United States, 1925 and 1926, from ores in which copper constitutes the principal value

State	Copper ore (short tons)	Copper produced		Gold produced (fine ounces)	Silver produced (fine ounces)	Value of gold and silver per ton of ore
		Pounds	Percentage			
1925						
Alaska	860,023	73,849,029	4.29	1,585.64	596,607	$0.52
Arizona	[1] 20,628,410	[2] 709,098,985	1.72	153,277.40	5,789,869	.35
California	906,644	44,500,353	2.45	16,460.85	699,305	.91
Colorado	2,193	286,410	6.53	1,936.51	53,902	35.31
Idaho	51,004	2,738,861	2.68	2,785.20	711,874	10.82
Michigan	7,036,751	155,157,488	1.10	------------	139,499	[3] .67
Missouri	22	12,100	27.50	------------	6	.18
Montana	3,130,087	[4] 257,629,524	4.12	31,874.54	8,542,372	2.10
Nevada	3,923,158	[5] 78,318,519	1.00	35,515.84	125,477	.21
New Mexico	3,172,291	76,101,442	1.20	15,636.14	163,561	.14
Oregon	2,740	105,600	1.93	375.06	1,941	3.32
Tennessee	794,930	19,788,234	1.24	358.99	102,949	.10
Utah	12,575,261	[6] 216,124,311	.86	87,167.79	959,735	.20
Washington	19,500	1,158,812	2.97	139.80	37,131	1.47
Total and average	53,103,014	1,634,869,668	1.54	347,113.76	17,924,228	.37

[1] Includes 1,039,512 tons of ore leached.
[2] Excludes 1,114,770 pounds of copper recovered from mine-water precipitates.
[3] Calculated only on ore that yielded silver.
[4] Excludes 4,804,364 pounds of copper recovered from mine-water precipitates.
[5] Excludes 476,540 pounds of copper recovered from mine-water precipitates.
[6] Excludes 7,359,866 pounds of copper recovered from mine-water precipitates.

Copper produced in the United States, 1925 and 1926, from ores in which copper constitutes the principal value—Continued

State	Copper ore (short tons)	Copper produced		Gold produced (fine ounces)	Silver produced (fine ounces)	Value of gold and silver per ton of ore
		Pounds	Percentage			
1926						
Alaska	670,000	[7] 67,778,000	5.06	1,693.13	597,818	$0.56
Arizona	[8] 22,030,481	[9] 718,448,062	1.63	167,904.55	5,983,511	.33
California	831,583	29,698,574	1.79	11,135.87	394,233	.57
Colorado	2,126	315,152	7.41	688.99	43,312	19.41
Idaho	28,258	586,387	1.04	431.64	429,343	9.80
Michigan	7,641,682	175,381,565	1.15		105,242	[3] .75
Missouri	50	44,000	44.00			
Montana	2,825,081	[10] 239,039,406	4.23	26,292.47	7,491,322	1.85
Nevada	4,888,681	[11] 100,529,055	1.03	36,408.95	142,316	.17
New Mexico	3,644,936	81,242,662	1.11	17,509.81	164,460	.13
North Carolina	15,150	1,468,700	4.85			
Oregon	5,632	293,411	2.60	562.32	6,482	2.78
Tennessee	608,040	18,606,664	1.53	417.09	104,000	.12
Texas	61	9,100	7.46		62	.64
Utah	13,949,866	[12] 239,141,740	.86	100,853.65	1,281,767	.21
Vermont	14,970	473,200	1.58	1.98	1,965	.08
Washington	25,297	1,348,545	2.67	190.98	18,456	.61
Total and average	57,181,894	1,674,404,223	1.46	364,091.43	16,764,289	.31

[3] Calculated only on ore that yielded silver.
[7] Includes a small quantity from lead ore.
[8] Includes 1,330,163 tons of ore leached.
[9] Excludes 2,350,343 pounds of copper recovered from mine-water precipitates.
[10] Excludes 5,044,108 pounds of copper recovered from mine-water precipitates.
[11] Excludes 341,843 pounds of copper recovered from mine-water precipitates.
[12] Excludes 1,132,550 pounds of copper recovered from mine-water precipitates and 5,054,499 pounds of copper from ore leached in place.

Copper produced in the United States, 1922–1924, from ores in which copper constitutes the principal value

State	1922		1923		1924	
	Copper ore (short tons)	Copper produced (pounds)	Copper ore (short tons)	Copper produced (pounds)	Copper ore (short tons)	Copper produced (pounds)
Alaska	581,384	77,967,469	731,168	85,915,589	761,779	74,071,273
Arizona	10,431,729	[1] 399,014,848	16,331,974	[2] 612,169,974	[3] 19,460,836	[4] 675,066,967
California	447,200	21,845,111	546,404	26,725,749	823,739	50,175,248
Colorado	863	105,864	4,655	302,685	1,803	119,315
Idaho	32,590	2,572,335	41,901	2,794,091	37,634	1,989,050
Michigan	4,952,264	121,712,365	5,363,160	138,304,080	5,372,572	135,662,605
Montana	3,250,213	[1] 152,823,229	4,392,291	[2] 213,554,072	3,278,662	[5] 238,852,990
Nevada	629,408	[1] 22,452,852	2,833,908	66,089,635	3,505,301	[6] 73,004,373
New Mexico	1,477,166	31,669,547	2,946,800	61,179,811	2,832,901	74,494,746
North Carolina			157	61,983		
Oregon	17,117	1,012,189	18,940	1,261,954	14,831	764,709
Tennessee	557,750	14,240,571	776,477	18,721,932	714,975	18,335,635
Texas	73	4,290	48	3,080		
Utah	4,509,380	[1] 90,523,462	11,519,722	[2] 209,575,614	12,357,366	[7] 223,285,907
Washington	6,086	312,912	11,128	855,152	15,916	927,407
Wyoming	24	4,296	584	111,280		
	26,893,247	936,261,340	45,519,317	1,437,626,681	49,178,315	1,566,750,225

[1] Exclusive of copper recovered as precipitates from mine waters, as follows: Arizona, 249,343 pounds; Montana, 10,037,514 pounds; Nevada, 187,190 pounds; Utah, 563,718 pounds.
[2] Exclusive of copper recovered as precipitates from mine waters, as follows: Arizona, 133,055 pounds; Montana, 5,781,839 pounds; and Utah, 4,726,339 pounds.
[3] Includes 1,100 tons of slag.
[4] Includes copper from 1,100 tons of slag and excludes 571,861 pounds of copper from mine-water precipitates.
[5] Excludes 4,215,942 pounds of copper from precipitates, but includes copper from 141,907 tons of tailings.
[6] Excludes 212,654 pounds of copper leached from ore "in place" and 108,309 pounds from mine-water precipitates.
[7] Excludes 11,668,436 pounds of copper recovered as precipitates from mine waters.

Copper ores concentrated, leached, and smelted, and copper produced from each class of ore in the United States, 1925 and 1926

1925

State	Ore concentrated			
	Short tons	Concentrates produced (short tons)	Copper produced (pounds)	Percentage of copper from ore
Alaska	840, 625	80, 795	45, 785, 584	2. 72
Arizona	16, 723, 155	1, 027, 191	396, 428, 008	1. 19
California	785, 280	68, 182	30, 658, 693	1. 95
Idaho	48, 235	6, 576	2, 416, 822	2. 51
Michigan	7, 036, 751	[1] 120, 528	[2] 155, 157, 488	1. 10
Montana	3, 003, 379	1, 311, 930	245, 049, 804	4. 08
Nevada	3, 844, 631	397, 434	72, 611, 578	. 94
New Mexico	[3] 3, 002, 700	147, 073	[3] 66, 973, 638	1. 12
Oregon	2, 740	548	105, 600	1. 93
Tennessee	342, 066	45, 857	8, 362, 978	1. 22
Utah	12, 538, 300	638, 000	213, 446, 624	. 85
Washington	18, 907	1, 611	1, 047, 074	2. 77
Total and average	48, 186, 769	3, 845, 725	1, 238, 043, 891	1. 28

State	Ore leached			Ore smelted		
	Short tons	Copper produced (pounds)	Percentage of copper	Short tons	Copper produced (pounds)	Percentage of copper
Alaska				19, 398	28, 063, 445	72. 34
Arizona	1, 039, 512	17, 290, 524	0. 83	2, 865, 743	295, 380, 453	5. 15
California				121, 364	13, 841, 660	5. 70
Colorado				2, 193	286, 410	6. 53
Idaho				2, 769	322, 039	5. 82
Missouri				22	12, 100	27. 50
Montana				126, 708	12, 579, 720	4. 96
Nevada				78, 527	5, 706, 941	3. 63
New Mexico	(3)	(3)	(3)	169, 591	9, 127, 804	2. 69
Tennessee				452, 864	11, 425, 256	1. 26
Utah				36, 961	2, 677, 687	3. 62
Washington				593	111, 738	9. 42
Total and average	1, 039, 512	17, 290, 524	. 83	3, 876, 733	379, 535, 253	4. 90

1926

State	Ore concentrated			
	Short tons	Concentrates produced (short tons)	Copper produced (pounds)	Percentage of copper from ore
Alaska	649, 750	[4] 74, 316	[4] 43, 182, 739	3. 35
Arizona	17, 800, 347	1, 053, 054	410, 065, 457	1. 12
California	788, 320	63, 012	26, 768, 333	1. 75
Idaho	26, 799	1, 470	455, 636	. 80
Michigan	7, 641, 682	[1] 136, 183	[2] 175, 381, 565	1. 15
Montana	2, 684, 887	1, 112, 857	225, 441, 875	4. 25
Nevada	4, 756, 591	422, 602	93, 428, 646	. 90
New Mexico	3, 523, 319	164, 896	74, 035, 200	1. 08
Oregon	5, 155	1, 031	227, 691	2. 21
Tennessee	286, 996	44, 594	10, 796, 413	1. 88
Utah	13, 880, 100	714, 918	233, 465, 293	. 84
Vermont	14, 970	1, 315	473, 200	1. 58
Washington	24, 868	1, 961	1, 220, 990	2. 45
Total and average	52, 083, 784	3, 792, 209	1, 294, 943, 038	1. 24

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[1] Includes concentrates from sands.

[2] Includes copper from sands.

[3] A quantity of copper ore from New Mexico was leached, but this may not be shown separately and is included under ore concentrated.

[4] Includes a small quantity from lead ore.

Copper ores concentrated, leached, and smelted, and copper produced from each class of ore in the United States, 1925 and 1926—Continued

1926—Continued

State	Ore leached			Ore smelted		
	Short tons	Copper produced (pounds)	Percentage of copper	Short tons	Copper produced (pounds)	Percentage of copper
Alaska				20, 250	24, 595, 261	60. 73
Arizona	1, 330, 163	21, 458, 773	0. 81	2, 899, 971	286, 923, 832	4. 95
California				43, 263	2, 930, 241	3. 39
Colorado				2, 126	315, 152	7. 41
Idaho				1, 459	130, 751	4. 48
Missouri				50	44, 000	44. 00
Montana				140, 194	13, 597, 531	4. 85
Nevada				132, 090	7, 100, 409	2. 69
New Mexico				121, 617	7, 207, 462	2. 96
North Carolina				15, 150	1, 468, 700	4. 85
Oregon				477	65, 720	6. 89
Tennessee				321, 044	7, 810, 251	1. 22
Texas				61	9, 100	7. 46
Utah	(5)	(5)	(5)	69, 766	5, 676, 447	4. 07
Washington				429	127, 555	14. 87
Total and average	1, 330, 163	21, 458, 773	. 81	3, 767, 947	358, 002, 412	4. 75

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[5] Ore leached in place in Utah yielded 5,054,499 pounds of copper; quantity of ore unknown.

Copper ores concentrated and smelted, and copper produced from each class of ore in the United States, 1922–1924

State	Ore concentrated					
	1922		1923		1924	
	Short tons	Copper produced (pounds)	Short tons	Copper produced (pounds)	Short tons	Copper produced (pounds)
Alaska	544, 212	48, 423, 640	686, 532	49, 933, 280	737, 646	49, 427, 639
Arizona	7, 617, 726	202, 095, 491	11, 997, 060	299, 547, 445	15, 707, 477	373, 727, 904
California	431, 601	19, 890, 598	516, 117	22, 550, 703	619, 440	30, 183, 107
Idaho	15, 776	708, 291	25, 813	1, 257, 580	27, 395	882, 154
Michigan	4, 952, 264	[1] 121, 712, 365	5, 363, 160	[1] 138, 304, 080	5, 372, 572	[1] 135, 662, 605
Montana	3, 132, 253	142, 465, 556	4, 259, 075	203, 004, 810	3, 157, 349	[2] 228, 792, 355
Nevada	518, 523	9, 745, 733	2, 722, 054	54, 943, 730	3, 418, 900	65, 540, 946
New Mexico	1, 416, 869	28, 406, 314	[3] 2, 834, 564	[3] 55, 350, 789	[3] 2, 706, 200	[3] 66, 776, 506
Oregon	15, 070	813, 869	17, 980	1, 176, 143	14, 746	757, 442
Tennessee	138, 440	2, 803, 994	276, 465	6, 070, 443	304, 739	7, 095, 048
Utah	4, 471, 711	88, 098, 018	11, 500, 803	208, 370, 507	12, 345, 452	221, 264, 006
Washington	4, 525	78, 284	10, 131	674, 312	15, 348	807, 221
	23, 258, 970	665, 242, 153	40, 209, 754	1, 041, 183, 822	44, 427, 264	1, 180, 916, 933

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[1] Includes copper from sands.

[2] Includes copper from 141,907 tons of tailings treated.

[3] A quantity of copper ore from New Mexico was leached, but this may not be shown separately and is included under ore concentrated.

Copper ores concentrated and smelted, and copper produced from each class of ore in the United States, 1922–1924—Continued

State	Ore smelted					
	1922		1923		1924	
	Short tons	Copper produced (pounds)	Short tons	Copper produced (pounds)	Short tons	Copper produced (pounds)
Alaska	37,172	29,543,829	44,636	35,982,309	24,133	24,643,634
Arizona	1,457,773	169,963,032	2,522,229	274,142,937	2,557,223	276,520,029
California	15,599	1,954,513	30,287	4,175,046	204,299	19,992,141
Colorado	863	105,864	4,655	302,685	1,803	119,315
Idaho	16,814	1,864,044	16,088	1,536,511	10,239	1,106,896
Montana	117,960	10,357,673	133,216	10,549,262	121,313	10,060,635
Nevada	110,885	12,707,119	111,704	11,111,992	86,401	7,463,427
New Mexico	60,297	3,263,233	112,236	5,829,022	126,701	7,718,240
North Carolina			157	61,983		
Oregon	2,047	198,320	960	85,811	85	7,267
Tennessee	419,310	11,436,577	500,012	12,651,489	410.236	11,240,587
Texas	73	4,290	48	3,080		
Utah	37,669	2,425,444	18,919	1,205,107	11,914	2,021,901
Washington	1,561	234,628	997	180,840	568	120,186
Wyoming	24	4,296	584	111,280		
	2,278,047	244,062,862	3,496,728	357,929,354	3,554,915	361,014,258

Copper produced from copper-lead and copper-lead-zinc ores in the United States, 1925 and 1926

State	Copper-lead and copper-lead-zinc ores (short tons)	Copper produced (pounds)	Percentage of copper
1925			
Arizona	24,565	833,163	1.70
Colorado	1,417	77,500	2.73
Idaho	6,275	90,477	.72
Montana	195,327	1,382,541	.35
Nevada	[1] 125	11,426	4.57
New Mexico	327	41,500	6.35
Utah	576	11,564	1.00
Total and average	228,612	2,448,171	.54
1926			
Arizona	25,020	976,026	1.95
California	383	22,125	2.89
Colorado	97	8,125	4.19
Idaho	22,037	116,124	.26
Montana	224,322	1,650,177	.37
Nevada	10,151	594,800	2.93
New Mexico	5	250	2.50
Total and average	282,015	3,367,627	.60

[1] Includes 14 tons of matte.

Copper produced from ores classed as copper-bearing (copper, copper-lead, and copper-lead-zinc ores) and total production of copper from all sources in the United States, 1925 and 1926

State	From copper, copper-lead, and copper-lead-zinc ores			Copper from all sources, including old slags, smelter cleanings, and precipitates (pounds)
	Ore treated (short tons)	Copper produced (pounds)	Percentage of copper	
1925				
Alaska	860,023	73,849,029	4.29	73,855,298
Arizona [1]	20,652,975	709,932,148	1.72	713,355,129
California	906,644	44,500,353	2.45	46,864,913
Colorado [2]	3,610	363,910	5.04	2,360,500
Idaho	57,279	2,829,338	2.47	3,297,443
Michigan	7,036,751	155,157,488	1.10	155,157,488
Missouri	22	12,100	27.50	12,100
Montana [1]	3,325,414	259,012,065	3.89	268,910,847
Nevada	3,923,283	78,329,945	1.00	79,300,224
New Mexico	3,172,618	76,142,942	1.20	76,427,825
Oregon	2,740	105,600	1.93	106,325
Pennsylvania				1,035,824
Tennessee	794,930	19,788,234	1.24	19,788,234
Utah [1]	12,575,837	216,135,875	.86	236,486,540
Washington	19,500	1,158,812	2.97	1,159,057
Total and average	53,331,626	1,637,317,839	1.54	1,678,117,747
1926				
Alaska	670,000	[3] 67,778,000	5.06	67,778,000
Arizona	22,055,501	719,424,088	1.63	723,296,051
California	831,966	29,720,699	1.79	33,466,299
Colorado [2]	2,223	323,277	7.27	3,403,850
Idaho	50,295	702,511	.70	1,337,442
Michigan	7,641,682	175,381,565	1.15	175,381,565
Missouri	50	44,000	44.00	1,077,000
Montana [1]	3,049,403	240,689,583	3.95	255,372,862
Nevada	4,898,832	101,123,855	1.03	101,827,937
New Mexico	3,644,941	81,242,912	1.11	81,642,379
North Carolina	15,150	1,468,700	4.85	1,468,700
Oregon	5,632	293,411	2.60	296,454
Pennsylvania				1,018,536
Tennessee	608,040	18,606,664	1.53	18,606,664
Texas	61	9,100	7.46	12,620
Utah [1]	13,949,866	239,141,740	.86	257,464,482
Vermont	14,970	473,200	1.58	473,200
Washington	25,297	1,348,545	2.67	1,351,890
Total and average	57,463,909	1,677,771,850	1.46	1,725,275,931

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[1] Considerable copper was recovered from mine-water precipitates and from ores not classed as copper ores.

[2] Most of the copper from Colorado is derived from ores classed as siliceous ores and lead ores.

[3] Includes a small quantity of copper from lead ore.

Copper produced from ores classed as copper-bearing (copper, copper-lead, and copper-lead-zinc ores) and total production of copper from all sources in the United States, 1922–1924

State	1922			1923			1924		
	From copper, copper-lead, and copper-lead-zinc ores		Copper from all sources, including old slags, smelter cleanings, and precipitates	From copper, copper-lead, and copper-lead-zinc ores		Copper from all sources, including old slags, smelter cleanings, and precipitates	From copper, copper-lead, and copper-lead-zinc ores		Copper from all sources, including old slags, smelter cleanings, and precipitates
	Ore treated	Copper produced		Ore treated	Copper produced		Ore treated	Copper produced	
	Short tons	*Pounds*	*Pounds*	*Short tons*	*Pounds*	*Pounds*	*Short tons*	*Pounds*	*Pounds*
Alaska	581, 384	77, 967, 469	77, 967, 819	731, 227	85, 920, 539	85, 920, 645	761, 808	74, 072, 232	74, 074, 207
Arizona [1]	10, 432, 164	399, 040, 128	400, 043, 128	16, 332, 203	612, 192, 830	618, 928, 602	19, 466, 080	675, 185, 630	677, 752, 013
California	447, 247	21, 849, 249	22, 539, 485	546, 487	26, 733, 433	28, 317, 759	823, 739	50, 175, 248	52, 107, 171
Colorado [2]	1, 490	166, 163	3, 373, 454	5, 035	326, 187	4, 248, 109	2, 228	160, 813	2, 713, 219
Georgia	600	6, 000	6, 000						
Idaho	58, 733	2, 864, 430	3, 282, 842	94, 192	3, 340, 434	3, 979, 631	42, 096	2, 043, 853	2, 738, 824
Michigan	4, 952, 264	121, 712, 365	121, 712, 365	5, 363, 160	138, 304, 080	138, 304, 080	5, 372, 572	135, 662, 605	135, 662, 605
Missouri			797, 400			202, 556			182, 811
Montana [1]	3, 271, 464	153, 027, 726	165, 754, 442	4, 498, 616	214, 152, 224	224, 125, 264	3, 487, 847	241, 072, 000	249, 152, 062
Nevada	629, 510	22, 464, 135	23, 133, 091	2, 834, 238	66, 111, 404	67, 204, 282	3, 505, 304	73, 004, 862	73, 805, 323
New Mexico	1, 479, 059	31, 882, 619	31, 937, 207	2, 947, 371	61, 215, 980	61, 356, 802	2, 833, 408	74, 534, 459	74, 691, 436
North Carolina				157	61, 983	61, 983			
Oregon	17, 117	1, 012, 189	1, 046, 525	18, 940	1, 261, 954	1, 283, 476	14, 831	764, 709	768, 395
Pennsylvania			1, 229, 926			1, 703, 480			1, 114, 694
Tennessee	557, 750	14, 240, 571	14, 240, 571	776, 477	18, 721, 932	18, 721, 932	714, 975	18, 335, 635	18, 335, 635
Texas	73	4, 290	4, 290	48	3, 080	4, 257			
Utah [1]	4, 510, 652	90, 648, 695	97, 193, 850	11, 520, 693	209, 666, 238	222, 393, 572	12, 357, 385	223, 291, 164	242, 138, 165
Washington	6, 086	312, 912	317, 203	12, 070	870, 309	871, 999	15, 916	927, 407	928, 458
Wyoming	24	4, 296	4, 296	584	111, 280	111, 280			
	26, 945, 617	937, 203, 237	964, 583, 894	45, 681, 498	1, 438, 993, 887	1, 477, 739, 709	49, 398, 189	1, 569, 230, 617	1, 606, 165, 018

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[1] Considerable copper was recovered from mine-water precipitates and from ores not classed as copper ores.

[2] Most of the copper from Colorado is derived from ores classed as siliceous ores and lead ores.

Copper ores produced in the United States, 1917–1926, and average yield in copper, gold, and silver

Year	Smelting ores		Concentrating ores		Total				
	Short tons	Yield in copper (per cent)	Short tons	Yield in copper (per cent)	Short tons	Yield in copper (per cent)	Yield per ton in gold (ounce)	Yield per ton in silver (ounce)	Value per ton in gold and silver
1917	7, 438, 068	4. 39	51, 044, 626	1. 19	58, 482, 694	1. 60	0. 0058	0. 347	$0. 49
1918	6, 223, 674	4. 51	53, 937, 796	1. 18	62, 289, 069	1. 51	. 0050	. 328	. 50
1919	3, 465, 880	4. 64	30, 769, 966	1. 35	36, 121, 622	1. 65	. 0052	. 356	. 51
1920	3, 200, 509	4. 89	31, 348, 340	1. 34	36, 765, 370	1. 63	. 0047	. 331	. 46
1921	1, 235, 602	4. 77	11, 022, 544	1. 44	13, 396, 382	1. 70	. 0039	. 357	. 44
1922	2, 278, 047	5. 36	23, 258, 970	1. 43	26, 893, 247	1. 74	. 0049	. 386	. 49
1923	3, 496, 728	5. 12	40, 209, 754	1. 29	45, 519, 317	1. 58	. 0060	. 321	. 39
1924	3, 554, 915	5. 08	44, 427, 264	1. 33	49, 178, 315	1. 59	. 0063	. 325	. 35
1925	3, 876, 733	4. 90	48, 186, 769	1. 28	53, 103, 014	1. 54	. 0065	. 338	. 37
1926	3, 767, 947	4. 75	52, 083, 784	1. 24	57, 181, 894	1. 46	. 0064	. 293	. 31

REVIEW BY STATES AND COMPANIES

SCOPE OF DISCUSSION

This section summarizes the conditions affecting production in the principal copper districts of the country. The tenor of the ore from each district is given, so far as it does not disclose the production of those individual companies whose figures of output have not already been published in their annual reports or elsewhere. More detailed information on the mining operations of the districts is given in the chapters on mine production.

In this report the individual companies' figures for metal output, ore reserves, metal content, and recovery in treatment, unless otherwise stated, are quoted from the published official reports of the companies. The chapter on copper in Mineral Resources for 1915 contains a map showing the location of the copper-producing districts and the metallurgical plants and also a brief discussion of the geologic occurrence of the ores in the several districts.

In 1926 the American Smelting & Refining Co. had available for dividends, after deducting all charges, taxes, bond interest, depreciation, and depletion, a net income of $17,760,721.16, compared with $15,190,760.28 in 1925; in view of the larger earnings, the company on November 1, 1926, raised the dividend on common stock to 8 per cent a year. During the year the company expended $7,581,629.22 in new undertakings, enlargements, and betterments, without additional financing. Statistics of the company's operations for several years are given in the following table:

Operations of the American Smelting & Refining Co., 1922–1926

	1922	1923	1924	1925	1926
PRODUCTION					
Gold............ounces..	1, 744, 550	1, 871, 790	1, 868, 407	1, 667, 849	1, 634, 158
Silver............do....	84, 793, 931	94, 424, 778	92, 229, 349	82, 223, 189	85, 482, 438
Platinum and palladium...do....	1, 165	1, 615	1, 998	(1)	(1)
Lead............short tons..	252, 898	338, 284	412, 416	455, 261	469, 607
Copper............pounds..	433, 548, 000	834, 340, 000	[2] 522, 472	[2] 502, 831	[2] 525, 897
Zinc............do....	35, 040, 000	59, 813, 434	[2] 39, 450	[2] 45, 246	[2] 48, 723
Nickel............do....	314, 586	452, 388	(1)	(1)	(1)
Tin............do....	3, 766, 000	5, 166, 458	[2] 486	(1)	(1)
Sulphuric acid............do....	28, 494, 000	66, 386, 000	[2] 35, 259	(1)	(1)
Arsenic............do....	11, 203, 052	14, 838, 789	[2] 10, 473	(1)	(1)
Copper sulphate............do....	2, 274, 000	2, 060, 000	(1)	(1)	(1)
By-product metals............do....	12, 700, 577	13, 392, 509	20, 146, 769	(1)	(1)
Sulphur dioxide............do....	1, 611	....	....	(1)	(1)
OPERATING STATISTICS					
Number of men employed exclusive of Mexico and South America..	8, 994	[3] 25, 477	[3] 25, 765	[3] 26, 401	[3] 28, 612
Total wages and salaries............	$12, 981, 167	(1)	(1)	(1)	(1)
Average wage per day............	$4. 01	(1)	(1)	(1)	(1)
Charge smelted............short tons..	3, 845, 849	5, 083, 655	5, 160, 236	5, 638, 730	5, 433, 547
Bullion refined............do....	477, 890	760, 602	898, 390	936, 346	990, 295
Coal used............do....	300, 556	527, 985	447, 710	390, 981	413, 351
Coke used............do....	376, 045	480, 904	486, 459	517, 401	508, 033
Fuel oil used............barrels..	1, 145, 212	1, 927, 055	2, 046, 663	2, 268, 267	1, 836, 923
Gas used............cubic feet..	1, 684, 226, 523	3, 427, 713, 457	4, 257, 998, 000	5, 432, 356, 000	6, 223, 869, 000
Ore mined............short tons..	2, 738, 463	2, 600, 249	1, 551, 259	1, 656, 212	1, 875, 991
Coal mined............do....	460, 144	543, 634	501, 779	433, 440	749, 646
Coke produced............do....	126, 968	171, 780	206, 189	323, 384	360, 270

[1] Not given.
[2] Short tons.
[3] Report does not specify "exclusive of Mexico and South America" in 1923 to 1926.

ALASKA

The output of blister copper from Alaska ores was 67,631,846 pounds in 1926, a decrease from 72,204,166 pounds in 1925. The 1926 production raised Alaska's total recorded production to 1,020,696,035 pounds, 2.72 per cent of the country's total from 1845 to 1926. Alaska remained in seventh place in 1926 among the copper-producing States. In smelter production for 1926 Alaska ranked seventh also, with 3.89 per cent of the total production of the country.

Prince William Sound.—The Beatson mine of the Kennecott Copper Corporation produced 418,091 tons of ore, having an average copper content of 1.67 per cent and 0.325 ounce silver a ton. The mill treated the entire tonnage, yielding 33,198 tons of concentrates, with a copper content of 17.68 per cent—a recovery of 85.94 per cent. In 1925 the production amounted to 493,005 tons of ore, averaging 1.663 per cent copper; it yielded 32,985 tons of concentrates, averaging 21.09 per cent copper—a recovery of 84.84 per cent.

Copper River district.—At Kennecott 106,933 tons of ore was produced, containing an average of 13.07 per cent copper and 2.61 ounces silver a ton. Of this quantity 98,885 tons was treated at the mill at Kennecott, and 20,370 tons of concentrates, with an average content of 38.79 per cent copper, were produced, representing a recovery of 94.53 per cent. In 1925, 136,836 tons of ore, containing an average of 10.72 per cent copper, was mined at Kennecott.

ARIZONA

Arizona is the most important copper-producing State, both in production for 1926 and in total production for the country from 1845 through 1926. In 1926 Arizona produced 729,324,537 pounds of copper, 41.92 per cent of the total for the United States; Montana, the nearest competitor in total production through 1926, produced 14.79 per cent of the country's total in 1926. Arizona's production in 1918, 769,521,729 pounds of copper, was the largest output ever made by one State. The production for 1926 ranks next. The State's total production through 1926 is 11,668,963,237 pounds, 31.08 per cent of the country's total of 37,541,682,651 pounds. Montana has produced 24.58 per cent of this total and Michigan 20.46 per cent. Arizona came into the lead in total production in 1920. In 1919 Montana stood first with 27.59 per cent of the total production and Arizona was a close second with 27.45 per cent. Among the six most important States in the output of copper, Arizona is the only one whose production is not made almost entirely from one district. The methods of mining copper in Arizona have been described by Young.[2]

Bisbee district.—The Bisbee district produced more copper during the period from 1845 through 1926 than any other district in Arizona, but since 1916 the Globe-Miami district has been making considerably larger annual production. Among the country's copper-producing districts leading in total production, Bisbee, with a total recorded production through 1926 of 3,455,825,000 pounds of copper, ranks next to the Butte and Lake Superior districts. Bisbee ranked sixth in production for 1926, with 140,668,000 pounds of copper.

Copper produced in Bisbee district, Arizona, 1919–1926, in pounds

1919	122, 311, 000	1923	123, 884, 000
1920	118, 448, 000	1924	140, 630, 000
1921	37, 249, 000	1925	145, 433, 000
1922	79, 591, 000	1926	140, 668, 000

The Phelps Dodge Corporation, its branches and subsidiaries, produced ores in 1926 which yielded the following metals: Copper, 197,849,933 pounds; lead, 4,212,054 pounds; silver, 1,470,523 ounces; gold, 43,756 ounces. Its purchased ores yielded 2,028,665 pounds of copper, 221,708 ounces of silver, 6,520 ounces of gold. The corporation sold a total of 276,318,068 pounds of copper at an average net price f. o. b. refinery of 13.861 cents a pound.

Copper-ore production from the limestone mines of the Copper Queen branch was considerably less than in 1925 from both company and lease ore shipments. The precipitation plant ran at better than 95 per cent capacity. Throughout the year the management endeavored to obtain a high-grade concentrate and a satisfactory extraction at the mill, and experiments were more satisfactory than in 1925. The concentrator handled 1,322,342 tons of ore, averaging 1.61 per cent copper, a part of which tonnage came from the southeast extension caving operations and the balance from Sacramento Hill. The ratio of concentration was 6.33 into 1; the total copper recovery amounted to 86.93 per cent; the sulphide recovery was equivalent to 91.53 per cent. The experimental work during 1926 resulted in the raising of the ratio of concentration. Early in the year the smelter-remodeling plans were changed and it was decided, instead of attempting to use a part of the old reverberatory plant, to erect a new plant which should consist of two new reverberatory furnaces with superimposed roasters. This entailed an entirely new departure in furnace and roaster practice. The new plant was pushed through in record time.

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[2] Young, G. J., "Methods of mining copper in Arizona": Eng. and Min. Jour.-Press, vol. 121, pt. 1, Mar. 13, 1926, pp. 437–441; "Methods of mining copper in Arizona": Eng. and Min. Jour.-Press, vol. 121, pt. 2, Mar. 20, 1926, pp. 476–483.

The company is also carrying on leaching operations. The first wash of that part of the heap to which irrigation is being confined was completed in July, 1925. From the beginning of leaching operations up to January 1, 1927, 39.07 per cent of the estimated copper content of the part of the heap being treated had been extracted—a recovery that exceeds previous estimates. The precipitation plant had an apparent recovery of 95.56 per cent. The Phelps Dodge Corporation paid its annual dividend of $2,750,000.

Metals produced by Copper Queen Consolidated Mining Co., 1919–1926

Year	Ore	Copper	Silver	Gold	Lead	Zinc
	Short tons	*Pounds*	*Ounces*	*Ounces*	*Pounds*	*Pounds*
1919	606, 386	68, 614, 002	492, 326	10, 813	9, 372	
1920	832, 172	71, 443, 396	486, 698	8, 846	243, 836	
1921	515, 632	30, 610, 173	495, 179	4, 650	4, 916, 418	
1922	389, 367	47, 962, 123	1, 132, 304	11, 972	8, 560, 525	247, 793
1923	1, 189, 570	87, 935, 334	935, 729	19, 151	6, 307, 412	610, 709
1924	2, 022, 196	109, 117, 018	906, 521	29, 850	6, 094, 613	
1925	1, 940, 737	116, 379, 978	1, 079, 733	32, 007	7, 103, 853	
1926	1, 921, 021	109, 269, 035	907, 292	35, 382	3, 868, 259	

Metals produced by Copper Queen branch of Phelps Dodge Corporation in 1926

	Ore, dry weight	Gold	Silver	Copper	Lead	Manganese
Underground limestone:	*Short tons*	*Ounces*	*Ounces*	*Pounds*	*Pounds*	*Pounds*
Copper	460, 896	27, 176	525, 833	50, 133, 054		
Silver-lead	17, 792	935	113, 844	487, 415	3, 868, 259	
Manganese	2, 490					2, 004, 934
	481, 178	28, 111	639, 677	50, 620, 469	3, 868, 259	2, 004, 934
Underground porphyry:						
Milling	191, 405	931	21, 700	8, 670, 480		
	191, 405	931	21, 700	8, 670, 480		
Sacramento Hill:						
Smelting	116, 078	1, 148	31, 894	14, 895, 074		
Milling	1, 131, 534	5, 192	213, 993	33, 905, 613		
	1, 247, 612	6, 340	245, 887	48, 800, 687		
Precipitates: Leach heap	826		28	1, 177, 399		
	1, 921, 021	35, 382	907, 292	109, 269, 035	3, 868, 259	2, 004, 934

The smelter of the Calumet & Arizona Mining Co. produced 112,588,220 pounds of blister copper in 1926, the largest output ever made by this company, compared with 103,949,220 pounds in 1925. The 693,760 dry tons of concentrates treated at the smelter were obtained from the following sources:

	Short tons
Calumet & Arizona Mining Co. ore:	
Bisbee	462, 474
85 branches	79, 707
New Cornelia concentrates	99, 362
Custom ore	52, 217
Total	693, 760

The Cottrell dust-collecting system, completed in 1924, in connection with the roasting department, continued to be successful in 1926; during the year it recovered a daily average of 60.8 tons of roaster dust, containing 24,200 pounds of copper. The dust chamber of the converter department recovered daily an average of 4.9 tons of converter dust, containing 3,513 pounds of copper. The acid plant ran throughout 260 days and produced 29,367.47 tons of 60° acid.

At the smelter 16.95 roasters were in operation during the year, handling 701,029 wet tons (113 tons a roaster day). The sulphur in the charge averaged 25.6 per cent, and the calcines contained 11.7 per cent. Three reverberatory furnaces were in operation during the year, operating 97.87 per cent of the total running time; 649,508 tons of dry ore was treated with an average of 1,779 tons a day. An average of 4.5 converters was operating.

The following description of the Campbell ore body is taken from the Calumet & Arizona Mining Co.'s annual report for the year 1926:

> At the Campbell shaft a considerable tonnage of high-grade ore has been developed in the 1,800, 1,700, 1,600, and 1,400 foot levels. The ore body previously designated as 250 feet southwest of the shaft on the 1,800-foot level has its major axis in a northwest-southeast direction. This ore body has been developed on the 1,800-foot level to a length of 440 feet, with an average width of 60 feet; on the 1,700-foot level to a length of 180 feet, with an average width of 55 feet; and on the 1,600-foot level to a length of 240 feet, with an average width of 50 feet. Raises between levels show the continuity of the ore body. Three hundred and fifty feet south of the shaft, on the 1,800-foot level, is another rich lens 120 feet long, 50 feet wide, and 78 feet high, so far as developed. There are also other, but smaller, enriched areas in this large mineralized zone. No work has been done here below the 1,800-foot level.

Metals produced by Calumet & Arizona Mining Co., 1919–1926

Year	Refined copper produced (domestic)	Gold	Silver	Dividends
	Pounds	*Ounces*	*Ounces*	
1919	44, 991, 107	28, 530	995, 366	$1, 927, 563
1920	42, 430, 847	32, 520	932, 489	2, 570, 084
1921	17, 855, 613	12, 365	419, 647	1, 285, 043
1922	30, 830, 615	23, 349	642, 174	1, 285, 047
1923	42, 166, 930	35, 693	824, 768	2, 248, 849
1924	41, 582, 030	31, 934	813, 791	1, 285, 063
1925	44, 557, 219	37, 287	832, 434	2, 571, 028
1926	45, 553, 208	35, 554	972, 650	3, 856, 542

On October 26, 1925, the Shattuck Denn Mining Corporation was formed by the consolidation of the Shattuck Arizona Copper Co. and the Denn-Arizona Copper Co. The figures that follow cover the operations of the new company during 1926:

Metallic production of the Shattuck Denn Mining Corporation in 1926

Shattuck mine:		
Copper ore mined	wet short tons	11, 242. 34
Copper ore shipped	do	11, 242. 34
Copper ore treated	dry short tons	10, 556. 46
Average moisture in copper ore	per cent	6. 61
Lead ores mined—		
Shipping ore	wet short tons	4, 710. 69
Milling ore	do	62, 166. 50
Lead ores shipped—		
Shipping ore	do	4, 710. 69
Milling ore	do	62, 244. 50
Lead ores treated—		
Shipping ore	dry short tons	4, 470. 58
Milling ore	do	59, 775. 12
Lead concentrates treated	do	7, 418. 49
Copper recovered from copper ore	pounds	1, 528, 697
Gold from copper ores	ounces	428. 99
Silver from copper ores	do	20, 978
Lead recovered—		
From ore treated	pounds	732, 712
From concentrates treated	do	5, 065, 650
Gold from lead ores and concentrates	ounces	6, 545. 44
Silver from lead ores and concentrates	do	256, 187
Denn mine:		
Copper ore mined	wet short tons	13, 952. 39
Copper ore shipped	do	13, 952. 39
Copper ore treated	dry short tons	12, 640. 70
Average moisture in copper ore	per cent	8. 95
Copper recovered	pounds	1, 516, 821
Gold from copper ores	ounces	531
Silver from copper ores	do	25, 927
Net operating cost per pound of copper	cents	11. 19
Net operating cost per pound of lead	do	6. 67
Average price per pound received for copper	do	13. 920
Average price per pound received for lead	do	8. 458

Metals produced by Shattuck Denn Mining Corporation, 1919–1926

[Shattuck Arizona Copper Co. prior to 1925]

Year	Copper (from copper ores)	Silver (from copper ores)	Gold (from copper ores)	Lead recovered	Copper recovered	Dividends [1]
	Pounds	*Ounces*	*Pounds*	*Ounces*	*Per cent*	
1919	2, 111, 841	89, 724	300	4, 432, 655	4. 74	$262, 500
1920	2, 374, 148	73, 718	575	8, 254, 603	6. 19	----------
1921 [2]	287, 928	12, 093	29	----------	7. 94	----------
1922	----------	----------	----------	----------	----------	----------
1923	3, 223, 209	157, 124	1, 349	1, 590, 682	6. 42	----------
1924	2, 630, 185	72, 671	754	5, 244, 526	6. 44	----------
1925	1, 828, 699	34, 246	633	3, 757, 811	5. 52	----------
1926	3, 045, 518	46, 905	960	5, 798, 362	6. 56	----------

[1] Capital distribution through 1924 to the amount of $1,487,500.

[2] Result of development work only. No productive operations carried on.

Globe-Miami district.—Since 1916 the Globe-Miami district has been the most important copper-producing district in Arizona, ranking second to the Bisbee district in total production for the period from 1845 through 1926. The total recorded production of copper in the Globe-Miami district through 1926 is 2,607,876,000 pounds. In total output the Globe-Miami district ranks fifth among the copper-producing districts of the country, and in output for 1026 it ranks third. The Globe-Miami district produced 175,386,000 pounds of copper in 1926 as compared to 175,272,000 pounds in 1925.

Copper produced in Globe-Miami district, Arizona, 1919–1926, in pounds

1919	171, 106, 000	1923	198, 426, 000
1920	176, 215, 000	1924	190, 452, 000
1921	76, 488, 000	1925	175, 272, 000
1922	170, 035, 000	1926	175, 386, 000

The smelter of the Old Dominion Co. remained idle throughout the year but was maintained in good condition for use. The high-grade smelting ore and all of the concentrates were shipped to the International smelter at Miami and were refined at Raritan, N. J. The tonnage mined, 362,213 tons, was the highest in the history of the mine, that of 1916, 358,223 tons, being second. The copper content of both smelting and concentrating ores decreased in 1926, and the average grade of the ore extracted decreased from 4.16 to 3.94 per cent copper.

Ore produced by Old Dominion Co. in 1926

	Short tons	Percentage of copper
Smelting ore	9, 978	8. 20
Concentrating ore	352, 231	3. 82
Precipitates	4	72. 82
	362, 213	3. 94

Metals produced by Old Dominion Co., 1919–1926 [1]

Year	Ore	Refined copper	Gold	Silver	Average grade of ore in copper
	Short tons	*Pounds*	*Ounces*	*Ounces*	*Per cent*
1919	253, 686	28, 166, 396	5, 756	137, 071	4. 28
1920	249, 111	22, 854, 452	3, 484	181, 010	4. 79
1921	61, 753	7, 389, 648	1, 187	71, 155	5. 31
1922	202, 954	18, 573, 289	3, 317	122, 095	5. 14
1923	289, 695	26, 764, 801	5, 137	190, 033	4. 95
1924	294, 999	25, 400, 670	5, 531	155, 814	4. 62
1925	355, 623	27, 283, 655	5, 752	150, 782	4. 16
1926	362, 213	25, 425, 833	7, 040	149, 235	3. 94

[1] Includes custom metals produced.

The Miami Copper Co. obtained good results during the year. At the beginning of 1925 its reserves were as follows: High-grade sulphide ore, 4,034,505 tons, containing an average of 2.08 per cent copper; mixed and sulphide ore, 6,000,000 tons, averaging 2 per cent copper; low-grade ore, 36,000,000 tons, averaging 1.06 per cent copper. At the beginning of 1927 there were 7,000,000 tons of mixed sulphide and oxide ores, averaging 1.83 per cent copper, and 84,586,743 tons of low-grade ore, averaging 0.93 per cent copper. During 1926 the company handled only low-grade ore. During the year the cost of producing copper was slightly more than 10.6 cents a pound. Four quarterly dividends were paid during the year, 25 cents for the first three quarters and 37½ cents for the last quarter, totaling $1.12½ a share and amounting to $840,505.25. The concentrating plant handled 3,793,207 tons of ore, at an average of 10,537 tons per day, during a 360-day running period. New construction amounted to $363,060.81, of which $120,551.31 was carried over from 1925 as work in progress.

Copper produced by Miami Copper Co., 1919–1926

Year	Ore	Copper content	Mill extraction	Refined copper	Dividends
	Short tons	*Per cent*	*Per cent*	*Pounds*	
1919	1, 698, 446	2. 040	82. 38	54, 221, 638	$1, 867, 785
1920	1, 801, 958	1. 968	82. 48	55, 581, 328	1, 494, 228
1921	1, 868, 757	1. 758	85. 37	53, 311, 941	1, 494, 228
1922	2, 183, 020	1. 883	86. 36	67, 454, 447	1, 494, 228
1923	2, 380, 155	1. 697	83. 98	64, 448, 345	1, 494, 228
1924	2, 444, 079	1. 624	80. 17	60, 475, 547	1, 494, 228
1925	2, 919, 600	1. 287	72. 60	51, 851, 274	933, 893
1926	3, 793, 207	. 979	76. 77	55, 289, 174	840, 505

Milling operations of Miami Copper Co. in 1926

Ore milled	short tons	3, 793, 207
Copper in ore	per cent	. 979
Concentrates produced	short tons	101, 921
Copper in concentrates	per cent	27. 962
	pounds	56, 999, 147
Copper recovered per ton of ore	do	15. 027
Mill extraction	per cent	76. 77

Cost of copper in concentrates f. o. b. cars at Miami, Ariz., in 1926

	Per ton of ore	Per pound of copper
Mining	$0. 37092	$0. 02545
Milling	. 49052	. 03365
General	. 14857	. 01019
	1. 01001	. 06929

Ore reserves of Miami Copper Co., January 1, 1927

	Short tons	Percentage of copper
Sulphide ore	84, 586, 743	0. 93
Mixed ore	7, 000, 000	1. 83
	91, 586, 743	

In 1926 the Inspiration Copper Co. produced 5,744,527 tons of ore containing an average of 1.011 per cent copper. The ore mined in 1925 contained 1.038 per cent copper. The output per man shift was 11.74 tons for all labor chargeable to mining ore as compared with 10.67 tons in 1925. In the Inspiration section 86,873 feet were developed, compared with 85,789 feet in 1925, and in the Live Oak section 66,961 feet were developed, compared with 44,573 feet in 1925. In addition, there were developed 11,103 feet in 1926 in the Keystone section. The ores were extracted from an undercutting area of 13.212 acres; 7,950 feet of churn and diamond drilling was done in these three sections; and 501,455 tons of ore was charged to the leaching tanks, the average copper content being 0.91 per cent total copper (0.72 per cent in oxide form). Fifty charges were treated and excavated, with a total extraction of 65.8 per cent. This recovery is considered small, and it is hoped that in 1927 an 80 per cent recovery will be attained. Dividends totaling $2,363,934 were paid during 1926.

Mill statistics, Inspiration Consolidated Copper Co. in 1926

Total ore milled	dry tons	5, 219, 662
Ore milled per day	do	14, 499
Average number of sections running		14. 8
Average rate per section	tons	978
Screen analysis of feed (on 48 mesh)	per cent	3. 6
Assay mill feed	per cent of copper	1. 020
Copper in feed, oxidized	per cent	. 207
Copper assay of general tailings	do	. 260
Copper in general tailings, oxidized	do	. 201
Copper in general concentrates, smelter assay	do	33. 985
Copper in flotation concentrates	do	35. 92
Copper in table concentrates	do	5. 57
Moisture in general concentrates	do	9. 00
Ratio of concentration		45. 7
Recovery of copper (calculated from smelter assays):		
Assays only	per cent	75. 08
Assays and weights of concentrates and ore	do	76. 18
Assays and weights of concentrates and tailings	do	75. 35
Assays and weights of ore and tailings	do	75. 08
Recovery of copper sulphides	do	92. 91
Water used per ton of ore	tons	1. 004
Power used per ton of ore milled:		
Coarse crushing	kilowatt-hours	0. 46
Fine grinding and concentrating	do	9. 56
Blowers for flotation air	do	1. 88
Filtering and reclaiming water	do	. 89
Lighting	do	. 12
		12. 91
Steel balls consumed in fine grinding per ton of ore milled	pounds	1. 5231
Flotation material per ton of ore milled:		
Lime	do	1. 39
Potassium and sodium xanthate	do	. 05
Pine oil	do	. 13
		1. 57

Copper produced by the Inspiration Copper Co. in 1926

	Ore treated (tons)	Copper produced (pounds)
Inspiration concentrating ore	3, 558, 921	49, 855, 862
Live Oak concentrating ore	1, 650, 898	28, 689, 550
Keystone concentrating ore	9, 843	150, 979
Inspiration ore to smelter	10, 661	207, 263
Live Oak ore to smelter	4, 665	100, 071
Keystone ore to smelter	1, 797	39, 773
Leaching ore	256, 492	2, 652, 586
	5, 493, 277	81, 696, 084
Less soluble anodes transferred to leaching plant		1, 543, 682
Net production available for sales		80, 152, 402

Distribution of tonnage mined in 1926

To:	Tons
Concentrator	5, 218, 589
Smelter	17, 123
Leaching plant	508, 815
Total	5, 744, 527

The mine of the Iron Cap Copper Co. was active throughout the year. The mill was operated from March to November—eight months. During the year 8,439 tons of rock, averaging a little over 2 per cent copper, was shipped from the old Williams dump. The following tables show the production and mill operations of the company:

Metallic production of the Iron Cap Copper Co., 1921–1926

	1921	1922	1923	1924	1925	1926
Ore (dry weight) short tons	4, 424	69, 675	83, 931	83, 312	55, 035	67, 215
Silver recovered ounces	4, 002	72, 005	75, 982	85, 680	149, 513	103, 601
Copper recovered pounds	385, 548	5, 829, 122	6, 134, 162	5, 383, 059	4, 566, 501	3, 897, 780
Average price received:						
Per ounce of silver	$1. 015	$0. 9952	$0. 77826	$0. 6725	$0. 689	$0. 628
Per pound of copper	$0. 12580	$0. 13425	$0. 14446	$0. 13024	$0. 13949	$0. 13808

Result of mill operation of the Iron Cap Copper Co. in 1926

Ore milled (dry)	short tons	46, 690
Average assay of feed	per cent of copper	2. 61
	ounce of silver per ton	. 85
Copper contained in ore	pounds	2, 441, 686
Silver contained in ore	ounces	39, 639
Concentrates produced (dry)	short tons	5, 258
Average assay of concentrates	per cent of copper	21. 48
	ounces of silver per ton	6. 26
Copper contained in concentrates	pounds	2, 259, 618
Silver contained in concentrates	ounces	32, 901
Tailings rejected (dry)	short tons	41, 432
Average assays of tailings	per cent of copper	. 220
	ounce of silver per ton	. 163
Copper contained in tailings	pounds	182, 068
Silver contained in tailings	ounces	6, 738
Recovery of copper	per cent	92. 54
Recovery of silver	do	83
Operating cost per dry short ton		$1. 66

In 1926 the Arizona Commercial Mining Co. produced 65,689 tons of ore containing an average of 5.17 per cent copper. From this tonnage 5,985,607 pounds of copper, 34,614 ounces of silver, and 1,444 ounces of gold were obtained. In 1925 this company produced 75,499 tons of ore containing an average of 5.91 per cent copper. During 1926 the company paid two dividends of 50 cents a share.

Copper, gold, and silver produced by the Arizona Commercial Mining Co., 1919–1926

Year	Refined copper	Gold	Silver	Year	Refined copper	Gold	Silver
	Pounds	*Ounces*	*Ounces*		*Pounds*	*Ounces*	*Ounces*
1919	7, 280, 861	1, 310	16, 918	1923	8, 115, 212	2, 143	37, 826
1920	7, 913, 836	1, 722	31, 028	1924	7, 760, 931	1, 883	32, 634
1921	572, 616	163	3, 001	1925	7, 860, 866	1, 972	39, 430
1922	6, 220, 923	1, 585	27, 532	1926	5, 985, 607	1, 444	34, 614

In 1926 the Superior and Boston Co. shipped 10,459 tons of dry ore, having an average content of 4.68 per cent copper and 12.23 ounces of silver a ton, and containing 979,083 pounds of copper and 127,906 ounces of silver. For this the company received $121,670.86 in net smelter returns after deducting freight and smelting charges, an average of $11.63 a ton.

Morenci-Metcalf district.—The production of the Morenci-Metcalf district increased from 59,464,000 pounds in 1925 to 63,950,000 in 1926. The total output of the district through 1926 is 1,721,468,000 pounds; it continues to rank seventh among the copper-producing districts of the United States.

Copper produced in Morenci-Metcalf district, Arizona, 1919–1926, in pounds

1919	44, 868, 000	1923	28, 735, 000
1920	35, 746, 000	1924	41, 047, 000
1921	11, 420, 000	1925	59, 464, 000
1922	14, 175, 900	1926	63, 950, 000

At the Morenci branch of the Phelps Dodge Corporation 1,550,358 dry tons of ore was produced, almost entirely from the Humboldt, Petaluma, and Clay mines. The No. 6 concentrator treated 1,509,068 tons of ore, and 129,990 tons of concentrates were shipped to the smelter at Clifton, which treated 178,300 tons of material and produced 64,740,600 pounds of copper. Improvements in mining and metallurgical methods at the Morenci branch have been described in articles by McHenry Mosier and John Martin,[3] and by Arthur Crowfoot.[4]

Yavapai County.—The output of copper in Yavapai County, mostly from the Jerome district, in 1926 and in several preceding years is given in the table that follows. From the beginning of operations through 1926 Jerome ranks as the sixth most important district in the production of copper. The chief producers of the district are the United Verde Copper Co. and the United Verde Extension Mining Co.

Copper produced in Yavapai County, Ariz., 1919–1926, in pounds

1919	80, 227, 549	1923	147, 718, 492
1920	114, 937, 080	1924	143, 348, 230
1921	26, 576, 298	1925	154, 017, 340
1922	76, 607, 502	1926	155, 368, 000

Operations at the smelter and mine of the United Verde Extension Mining Co. were continuous during 1926. A total of 199,671 tons of ore, containing an average of 10.61 per cent copper, 0.042 ounce of gold, and 1.78 ounces of silver a ton, was mined, and 198,911 tons, containing 10.70 per cent copper, 0.042 ounce of gold, and 1.78 ounces of silver a ton, was smelted. From this tonnage 43,041,576 pounds of copper was extracted. During the year the company paid quarterly dividends totaling $3 a share.

Cost [5] of producing copper by United Verde Extension Mining Co. in 1926

	Cents per pound
Mining	2. 51
Smelting	2. 10
Freight on ore	. 09
Freight on bullion, refining, selling	1. 76
Other expenses	. 01
	6. 47

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[3] Mosier, McHenry, and Martin, John, "Mining methods at Morenci": Eng. and Min. Jour.-Press, vol. 120, Dec. 26, 1925, pp. 1006–1012.

[4] Crowfoot, Arthur, "Evolution of copper-ore concentration at Morenci, Ariz.": Eng. and Min. Jour.-Press, vol. 120, Dec. 5, 1925, pp. 884–890.

[5] Exclusive of depreciation, reserve to return capital (depletion), and taxes.

Copper produced by the United Verde Extension Mining Co., 1919–1926

Year	Ore treated	Copper produced	Silver	Gold
	Short tons	*Pounds*	*Ounces*	*Ounces*
1919	93,325	28,860,615	272,855	3,169
1920	161,617	41,942,700	359,370	5,530
1921	53,643	12,498,005	112,864	2,328
1922	136,980	31,640,714	238,764	5,788
1923	172,629	41,855,959	257,602	8,992
1924	185,858	44,278,947	(1)	(1)
1925	[2] 183,309	43,720,324	(1)	(1)
1926	198,911	43,041,576	(1)	(1)

[1] Figures not available.
[2] Includes 2,546 dry tons custom concentrates smelted.

The mines and plants of the United Verde Copper Co. were continuously active throughout 1926.

Ray or Mineral Creek district.—In 1926 the Ray or Mineral Creek district produced 69,930,000 pounds of copper, compared with 74,695,000 pounds in 1925. The total recorded output of the district through 1926 is 887,272,000 pounds; it continues to rank tenth among the copper-producing districts of the country.

At the Ray mines of the Nevada Consolidated Copper Co. 2,957,200 tons of copper ore was treated in 1926, a daily rate of 8,102 tons, compared with 3,037,700 tons, a daily rate of 8,322 tons, in 1925. The estimated reserves at the Ray mines were 89,860,223 tons of ore, averaging 1.68 per cent copper, at the beginning of 1926. Since the beginning of operations 36,783,711 tons of ore has been mined. In 1926 the cost of milling was 54.3 cents a ton, and the mining cost, exclusive of depreciation and taxes, was 81.2 cents a ton. The total capacity of the Hayden plant now exceeds 10,000 tons daily. Further data concerning the Ray branch have been blanketed in the total figures for the Ray, Chino, and Nevada properties in the report of the main company, the Nevada Consolidated Copper Co., as given under Nevada (p. 601).

The mining methods being used at Ray mines and the new flow sheet at the Hayden mill are described in the Arizona Mining Journal.[6]

Copper produced by Ray mines of the Nevada Consolidated Copper Co., 1919–1926

Year	Ore milled	Copper content	Mill recovery	Refined copper
	Short tons	*Per cent*	*Per cent*	*Pounds*
1919	1,621,600	1.814	79.45	46,011,371
1920	1,706,928	1.720	81.98	47,062,030
1921	406,172	1.646	77.82	10,110,131
1922	1,178,350	1.587	76.66	27,953,408
1923	2,689,800	1.571	74.87	61,385,205
1924	2,896,700	1.523	78.27	67,017,981
1925	3,037,700	1.500	84.45	74,691.091
1926	2,957,200	(a)	(a)	(a)

[a] Not given separately. The copper content of Ray, Nevada, and Chino production was 1.268 per cent; mill recovery, 86.26 per cent; and refined copper output, 231,119,539 pounds.

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[6] Thomas, R. W., "Mining methods being used at Ray mines": Ariz. Min. Jour., vol. 9, No. 22, Apr. 15, 1926, pp. 7–9. Garms, W. I., "Remodeled flow sheet at Hayden plant": Ariz. Min. Jour., vol. 9, No. 20, Mar. 15, 1926, pp. 5–8.

Ajo district.—The New Cornelia Copper Co. mined and delivered to crushing plants for flotation concentration 2,388,606 wet tons (equivalent to 2,327,936 dry tons) of sulphide ore, containing an average of 1.629 per cent copper—1.409 per cent in sulphides and 0.220 per cent in oxides. There was 1,098,774 wet tons of carbonate ore (1,077,238 dry tons), averaging 1.20 per cent copper, mined and delivered to crushing plants for leaching operations. The ore averaged 1.119 per cent soluble copper and 0.081 per cent insoluble copper. At the end of 1925 the company estimated that the reserves of sulphide ore were 52,219,427 tons containing an average of 1.31 per cent copper and 2,363,896 tons containing an average of 3.65 per cent copper. At that time the reserves of carbonate ore were estimated to be 3,277,028 tons, averaging 1.25 per cent copper. The concentrating plant, which was designed to treat 5,000 tons of ore a day, handled a daily average of 6,441.1 tons. During the year distributions to stockholders totaled $2,880,000. Rickard[7] has described the mining and metallurgical methods of the company.

Copper produced by the New Cornelia Copper Co., 1921–1926, in pounds

	1921	1922	1923	1924	1925	1926
Electrolytic copper	19, 993, 758	26, 408, 610	36, 063, 832	22, 746, 882	15, 979, 895	17, 405, 991
Cement copper	169, 035	140, 732	2, 303, 886	1, 729, 479	1, 305, 265	836, 282
Copper in ore shipped	35, 589	63, 461				
Copper from concentrates				39, 407, 932	51, 977, 126	64, 070, 190
	20, 198, 382	26, 612, 803	38, 367, 718	63, 884, 293	69, 262, 286	82, 312, 463

Silver Bell district.—The Silver Bell district produced 1,828,000 pounds of copper in 1926, compared with 3,048,000 pounds in 1925.

Pima district.—The Pima district produced 1,179,000 pounds of copper in 1926, compared with 2,408,000 pounds in 1925.

Pioneer district.—The mine of the Magma Copper Co. produced 248,787 tons of ore of all classes, a daily average of 686 tons. This ore contained an average of 6.27 per cent copper, 2.78 ounces of silver and 0.028 ounce of gold a ton. The net metal output for the year, after deducting all losses, including those of refining, was 29,135,132 pounds of copper, 860,183.92 ounces of silver, and 9,100.161 ounces of gold. Concentrator operations were continuous during 1926. The average assay of the mill heads was 5.04 per cent copper, and of the tailings it was 0.23 per cent copper. The average recovery was 96.93 per cent. Four dividends totaling $1,224,465 were declared during the year, one of which was payable January 15, 1927. The net cost of producing copper, after the deduction of gold and silver credits, was 7.903 cents a pound. This cost does not include allowances for depreciation and interest but includes all other fixed and general expenses. Austin[8] has described the smelter.

CALIFORNIA

In California there was a falling off in production of blister copper from 46,943,604 pounds in 1925 to 30,442,961 pounds in 1926. California ranked eighth among the copper-producing States in 1926 and eighth also in total production from the beginning of operations, the total production through 1926 being 970,488,599 pounds, 2.59 per cent of the country's total. During 1925 all the commercial ore in the Mammoth mine and other mining properties tributary to the copper smelter of the United States Smelting, Refining & Mining Co. was declared exhausted by the company, and the entire property was closed down and scrapped. Plumas County, Shasta County, and the Foothill district furnished the greater part of California's output in 1926.

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[7] Rickard, T. A., "The later story of the New Cornelia enterprise": Eng. and Min. Jour.-Press, vol. 119, Feb. 14, 1925, pp. 285–289.

[8] Austin, L. S., "Features of the Magma copper smelter": Eng. and Min. Jour.-Press, vol. 121, Apr. 17, 1926, pp. 643–644.

Shasta district.—The Shasta district produced 5,061,000 pounds of copper in 1926, compared with 14,551,000 pounds in 1925 and with 21,056,000 pounds in 1924. The smelter of the United States Smelting, Refining & Mining Co. was closed down on September 1, 1925, and the equipment was scrapped. The Shasta district has yielded a total output through 1926 of 619,799,000 pounds of copper and ranks eleventh in total production.

Foothill district.—The Foothill district produced 5,241,000 pounds of copper in 1926, bringing its total production through 1926 up to 171,633,000 pounds.

Plumas district.—In 1926 the Plumas district produced 22,163,000 pounds of copper, compared with 26,918,000 pounds in 1925. The Engels Copper Mining Co. is the most important producer in the district.

The Engels Copper Mining Co. produced 13,344,863 pounds of copper, 182,939.54 ounces of silver, and 1,629.652 ounces of gold during 1926, bringing its total gross production of copper from the beginning of operations in 1914 to 121,648,888 pounds. The cost of production, exclusive of depletion, was 11.8589 cents a pound; the increase of 1.2718 cents a pound from the cost of 1925 was mainly due to the decrease in the grade of ore milled. The average recovery at the Superior mill decreased from 93.16 per cent in 1925 to 88.66 per cent in 1926. Dividends totaling $215,817.23 were paid during 1926, bringing the total dvidends paid since 1914 to $1,285,971.55.

Cost of producing copper by Engels Copper Mining Co. in 1926

		Total	Per pound of copper
			Cents
Operating cost		$1,054,061.33	7.8986
Freight and smelting charges	$666,639.08		
Credit value of gold and silver recovered	138,148.75		
		528,490.33	3.9603
Operating and marketing cost		1,582,551.66	11.8589
Depreciation costs		105,021.28	.7870
Development amortization		51,152.16	.3833
		1,738,725.10	13.0292

Operations at Superior mill in 1926

Ore milled	short tons	421,618
Average heads	per cent	1.785
Average tails	do	.213
Actual extraction	do	88.66
Concentrates produced	pounds	53,774,145
Average content of concentrates	per cent	24.816
Copper produced	pounds	13,344,863
Silver produced	ounces	182,939.5406
Gold produced	do	1,629.6518

Ore reserves of Engels and Superior mines, December 31, 1926, in short tons[1]

Mine	Blocked ore		Probable ore	Total
	In place	Broken in stopes		
Engels	425,808	186,072	110,380	722,260
Superior	84,800	96,778	2,390	183,968
	510,608	282,850	112,770	906,228

[1] This estimate of ore reserves represents ore that assays approximately 2 per cent in copper.

Operations at the mine of the Walker Mining Co. were continuous throughout the year; 223,840 tons of ore was broken; 250,082 tons, containing an average of 1.872 per cent copper, was treated at the concentrator; and 17,889.96 tons of concentrates were produced. The average recovery was 92.685 per cent, a decrease from the average of 94.488 per cent in 1925. There were sold to the smelter 18,174.44 tons of concentrates and ore containing 8,818,172 pounds of copper, 162,079.77 ounces of silver, and 7,478.94 ounces of gold.

COLORADO

Although Colorado ranks tenth among the copper-producing States of the country, both in output for 1926 and in total recorded output from the beginning of operations through 1926, a very small proportion of the copper produced is from ores classed as copper ores. The blister production of Colorado in 1926 amounted to 4,657,591 pounds, or 0.27 per cent of the total for the United States. Colorado's output of copper is derived mainly from the treatment of mixed ores in which copper is a minor constituent; these ores include lead-silver ores and pyritic ores rich in gold and silver. No important district in the State now yields ore mainly valuable for copper. The total smelter output of copper in Colorado through 1926 is 310,563,934 pounds, or 0.83 per cent of the country's total.

IDAHO

In 1926 the production of blister copper from Idaho amounted to 1,171,262 pounds, or 0.07 per cent of the total for the country, and Idaho ranked thirteenth among the copper-producing States. Idaho ranks eleventh in total production through 1926, with a total of 129,083,483 pounds. The mine output of copper in Idaho in 1926 was 1,337,442 pounds, of which the Alder Creek district furnished only 243,816 pounds. In 1925 the Alder Creek district produced 2,356,000 pounds of copper out of a total of 3,297,443 pounds for the State.

MICHIGAN

Lake Superior district.—In the production of copper from the beginning of operations through 1926 Michigan has been surpassed only by Arizona and Montana. The smelter production through 1926 is 7,679,756,411 pounds, or 20.46 per cent of the total of 37,541,682,651 pounds for the United States. In smelter production for

1926, Michigan ranked fourth, with an output of 174,778,884 pounds, or 10.05 per cent of the country's total. The mine production of Michigan in 1926 was 175,381,565 pounds.

The Lake Superior district ranks second only to the Butte district in total production from the beginning of operations, with a total recorded mine production through 1926 of 7,658,391,000 pounds, compared with 9,170,417,000 pounds produced by the Butte district. In 1926 the Lake Superior district ranked fourth in mine production, with an output of 175,382,000 pounds, and fourth also in 1925, with an output of 155,157,000 pounds.

Copper ore produced in Lake Superior district, Michigan, 1917–1926

Year	Short tons	Yield of copper (per cent)	Year	Short tons	Yield of copper (per cent)
1917	12, 400, 723	0. 99	1922	4, 952, 264	1. 23
1918	11, 321, 365	. 96	1923	5, 363, 160	1. 29
1919	7, 690, 253	1. 16	1924	5, 372, 572	1. 26
1920	5, 938, 967	1. 30	1925	7, 036, 751	1. 10
1921	3, 610, 648	1. 20	1926	7, 641, 682	1. 15

The mines of the Calumet & Hecla Consolidated Copper Co. produced 73,297,924 pounds of copper in 1926 at an average cost, including cost of selling but no charges for depreciation and depletion, of 10.59 cents a pound. The average price received for copper delivered was 14.23 cents a pound. The Calumet & Hecla reclamation plants at Lake Linden and Hubbell produced 30,988,076 pounds of copper from 2,756,177 tons of sand at an average cost of 7.10 cents a pound. This copper production was segregated as follows: 8,290,076 pounds was obtained by concentration, 18,212,000 pounds by leaching, and 4,486,000 pounds by flotation. The heads averaged 0.694 per cent copper and the tails 0.124 per cent. There was 11.24 pounds of copper produced per ton of ore treated. During 1926 three 50-cent dividends were paid, amounting to $3,008,253.

The Isle Royale Copper Co. treated 447,747 tons of rock and produced 11,017,000 pounds of refined copper, 24.61 pounds to a ton of rock, compared with 9,543,000 pounds of refined copper from 378,459 tons of rock, 25.22 pounds to a ton, in 1925. The company paid dividends totaling $150,000 in 1926.

Operations at the Calumet & Hecla reclamation plants at Lake Linden and Hubbell in 1926 and for the entire period of their operation

	1926	Since starting
Quantity treated short tons	2, 756, 177	15, 131, 000
Assay headings per cent	0. 694	0. 688
Assay tailings do	0. 124	0. 166
Refined copper produced pounds	30, 988, 076	158, 675, 000
Refined copper produced per ton treated do	11. 24	10. 49

The Baltic, Champion, and Trimountain mines produced 23,526,277 pounds of refined copper in 1926, of which 14,696,867 pounds was for the Copper Range Co.; one-half of the Champion output belonged to the St. Mary's Mineral Land Co. There was 644,648 tons of rock stamped which yielded, after stamping, an average of 36.49 pounds of copper per ton, compared with 39.38 pounds per ton in 1925. During the six years, 1920–1925, inclusive, the Baltic and Trimountain mines worked at a loss, but in every year of this period, except 1920, the profits of the Champion mine and the railroad resulted in a net operating profit for the company. In 1926 the Trimountain mine was also operated at a profit before depreciation and depletion, but the Baltic mine at a loss. The Copper Range Co. paid dividends totaling $394,755 in 1926.

Copper produced by the Champion Copper Co., 1919–1926

Year	Rock stamped	Copper produced	Yield per ton	Cost per pound [1]	Price received	Net profits
	Short tons	*Pounds*	*Pounds*	*Cents*	*Cents*	
1919	503, 030	19, 886, 917	39. 534	11. 62	18. 67	$1, 399, 714. 19
1920	321, 664	13, 610, 324	42. 419	14. 40	17. 17	399, 772. 65
1921	531, 780	20, 719, 307	39. 018	9. 82	13. 329	719, 955. 51
1922	503, 593	19, 583, 806	38. 964	9. 93	14. 359	890, 515. 16
1923	449, 130	18, 412, 630	41. 03	11. 14	14. 86	738, 871. 98
1924	457, 160	20, 061, 630	43. 88	10. 49	13. 76	709, 276. 53
1925	414, 645	17, 957, 605	43. 308	11. 73	14. 258	497, 764. 43
1926	454, 654	17, 658, 820	38. 84	10. 83	13. 948	597, 042. 27

[1] Excludes depreciation and depletion.

Copper produced by the Baltic mine, 1919–1926

Year	Rock stamped	Copper produced	Yield per ton	Cost per pound [1]	Price received	Net profits
	Short tons	*Pounds*	*Pounds*	*Cents*	*Cents*	
1919	235, 832	7, 864, 653	33. 35	17. 53	18. 67	$89, 305. 51
1920	175, 357	6, 613, 918	37. 71	18. 02	17. 11	[2] 59, 882. 60
1921	195, 816	7, 608, 847	38. 86	14. 15	13. 078	[2] 81, 668. 95
1922	165, 804	5, 329, 568	32. 14	16. 76	13. 958	[2] 149, 578. 09
1923	137, 801	4, 877, 248	35. 51	18. 42	14. 626	[2] 189, 880. 94
1924	150, 101	4, 769, 286	31. 77	15. 95	13. 76	[2] 104, 574. 24
1925	140, 958	4, 255, 069	30. 18	17. 74	14. 25	[2] 148, 517. 14
1926	126, 157	3, 690, 041	29. 25	18. 28	13. 94	[2] 160, 073. 52

[1] Excludes depreciation and depletion.

[2] Deficit.

Copper produced by the Trimountain mine, 1919–1926

Year	Rock stamped	Copper produced	Yield per ton	Cost per pound [1]	Price received	Net profits
	Short tons	*Pounds*	*Pounds*	*Cents*	*Cents*	
1919	171, 995	5, 274, 387	30. 66	19. 39	18. 668	$51, 303. 34
1920	116, 768	3, 532, 025	30. 24	25. 51	17. 115	[2] 247, 390. 52
1921	143, 172	4, 341, 584	30. 32	18. 27	13. 078	[2] 183, 560. 50
1922	130, 913	4, 116, 100	31. 44	16. 46	14. 359	[2] 67, 576. 58
1923	6, 273	281, 482	44. 87	(3)	(3)	[2] 140, 563. 74
1924	8, 159	278, 259	34. 10	(3)	(3)	[2] 87, 053. 47
1925	35, 465	1, 065, 044	30. 03	(3)	(3)	[2] 39, 302. 47
1926	63, 837	2, 177, 416	34. 11	13. 43	13. 94	11, 253. 16

[1] Excludes depreciation and depletion.

[2] Deficit.

[3] Figures not given.

At the Mohawk mine 721,066 tons of rock was stamped in 1926, producing 26,747,400 pounds of mineral and mass copper, which yielded 18,340,712 pounds of refined copper, or 25.435 pounds of copper per ton of rock. The Mohawk Mining Co. owns the Wolverine property also; the following quotation from its report gives the amount of refined copper that has been produced in the past from this mine which the company reported as virtually exhausted in 1925.

> Sight should not be lost of the fact that the Mohawk mine has 320 acres of additional land on the Kearsarge Lode not yet opened for mining, exactly under the mineralized zone of the Wolverine mine. From the mineral ground on the Kearsarge Lode in the original Wolverine mine location of 205 acres were taken 188,797,097 pounds of refined copper.

The Mohawk Mining Co. paid dividends in 1926 totaling $575,000.

Copper produced by the Mohawk Mining Co. in 1926

Rock hoisted	short tons	734, 879
Rock stamped	do	721, 066
Product of mineral	pounds	26, 747, 400
Refined copper produced	do	18, 340, 712
Yield per ton of rock treated	do	25. 435
Cost per ton of rock hoisted		$1. 836
Cost per ton of rock stamped		$1. 871
Operating cost per pound of refined copper	cents	7. 357
Cost of taxes	do	. 269
Cost of smelting, freight, and marketing product, including eastern offices' expenses	cents	1. 546
		9. 172

In 1926 the Quincy Mining Co. produced 517,900 tons of copper rock and mass, which yielded 13,290,052 pounds of refined copper, or 25.66 pounds of refined copper a ton, the highest average yield obtained by the company in any year during the past 20 years. The quantity of copper rock hoisted at the mine was 69,000 tons less than in 1925, but, as the yield was slightly higher, the output of refined copper declined only 1,067,471 pounds. The smelter operated throughout the year. The 105,027 ounces of silver produced by this mine in 1926 was practically the only silver recovered by Michigan copper mines during the year.

Copper produced by the Quincy Mining Co., 1924–1926

Year	Copper rock and mass	Mineral	Copper	Yield of copper per ton of rock
	Short tons	*Pounds*	*Pounds*	*Pounds*
1924	588, 100	24, 489, 920	14, 838, 633	25. 24
1925	586, 913	22, 721, 380	14, 357, 523	24. 46
1926	517, 900	20, 220, 795	13, 290, 052	25. 66

MISSOURI

During 1926 Missouri produced 54,378 pounds of blister copper.

MONTANA

Among the copper-producing States Montana stands second only to Arizona in total recorded output from the beginning of operations through 1926. In 1926 Montana ranked third among the copper-producing States. The smelter output of the State in 1926 was 257,271,936 pounds, or 14.79 per cent of the total for the country, and the production through 1926 is 9,228,288,655 pounds, or 24.58 per cent of the total. Unlike Arizona, which contains a number of important copper-producing districts, Montana has only one outstanding district, Butte. M. B. Milligan,[9] of the State Board of Equalization, published an article in 1925 on mine taxation in Montana.

Butte district.—The Butte district is the leading copper-producing district in the United States, both in output for 1926 and in total output from the beginning of operations through 1926. The total output of its nearest competitor, the Lake Superior district, is more than 1,500,000,000 pounds less. Through 1926 Butte produced a total of 9,170,417,000 pounds of copper; in 1926 it produced 252,991,000 pounds. The Anaconda Copper Mining Co. is by far the most important producer in the district. The output of the Butte district for a number of years is given in the following table:

Copper and associated metals produced in Butte district, Montana, 1919–1926

Year	Copper	Gold	Silver	Year	Copper	Gold	Silver
	Pounds		*Ounces*		*Pounds*		*Ounces*
1919	169,051,000	$576,756	10,527,457	1923	223,043,000	$624,528	11,835,643
1920	176,399,000	643,595	10,570,676	1924	247,364,000	730,646	11,859,290
1921	47,958,000	280,085	4,980,285	1925	266,637,000	746,422	11,561,659
1922	165,374,000	540,936	10,394,811	1926	252,991,000	678,290	11,058,861

The annual report of the Anaconda Copper Mining Co. for 1926 says in substance:

The mines of the company produced during the year 2,562,344.55 tons of copper ore; 8,105.92 tons of precipitates were produced from the water pumped from the mines. At the concentrator there were treated 2,638,646.40 tons of copper ore, and 308,804.65 tons of copper tailings were treated by the combined leaching and flotation process. The Anaconda reduction works treated for all companies 2,882,903.55 tons of copper ore and other cupreous material. Of the total amount 2,570,161.62 tons of ore was produced by the mines of the company, 269,920.84 tons of ore was purchased from and treated for other companies, 38,033.87 tons of material were shipped from the old plants at Anaconda and Great Falls, and 4,779.70 tons were shipped from the Great Falls zinc plant. There were produced 254,317,367 pounds of fine copper, 8,227,177.76 ounces of silver, and 31,764.959 ounces of gold. Of this production, 254,302,568 pounds of fine copper, 8,226,723.92 ounces of silver, and 31,764.094 ounces of gold were produced by the company.

Construction of an extension to the refineries was authorized at an estimated cost of $1,180,000 during 1925, and a further additional cost was assigned during 1926. The extension was completed in

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[9] Milligan, M. B., "Mine taxation in Montana": Eng. and Min. Jour.-Press, vol. 120, Dec. 26, 1925, pp. 1013–1015

1926 and increased the capacity of the refineries from 216,000,000 to 312,000,000 pounds per annum. The provision of these facilities will enable the company to refine in Montana all copper produced there and deliver it to western and middle western points, thereby saving freight to the Atlantic seaboard. The output of the copper refinery at Great Falls was 243,285,551 pounds of cathodes, of which 235,756,846 pounds were melted into shapes at that point. The mill at Great Falls rolled into rods 168,306,036 pounds of copper; 41,527,844 pounds of rods were drawn into wire, of which 17,296,050 pounds were made into strand. From this mill 52,631,475 pounds of rods were shipped to the Kenosha plant of the American Brass Co. to be drawn into wire. The improvements at the Raritan plant, begun during 1925 but not completed at the end of 1926, which are to cost about $1,600,000, are to increase the capacity of the plant to 45,000,000 pounds of copper a month, and the cost of refining is to be materially reduced. The increased capacity is being provided in anticipation of the production of copper from the Andes mine in Chile. The metal output of the Raritan plant was 393,201,524 pounds of fine copper, 21,735,903.02 ounces of silver, 132,335.146 ounces of gold, 20,905 pounds of selenium, 167.5 pounds of tellurium, 354,455 pounds of nickel sulphate, 383,657 pounds of copper sulphate, 455.88 ounces of platinum, and 1,223.26 ounces of palladium.

The copper operations of the company were conducted at less than full capacity. The operating profit and income from investments amounted to $29,371,916.90, as compared with $33,077,229.48 for 1925. The net profit, after all charges, including depreciation, bond interest, and discount, were deducted, amounted to $14,226,202.61 as compared with $17,540,532.32 for 1925. The American Brass Co.'s operations in 1926 were at a rate 5.1 per cent higher than the rate maintained in 1925, the previous record year, and established a new record of production, 686,643,052 pounds. Dividends totaling $9,000,000 were paid during 1926 by the Anaconda Copper Mining Co.; the same amount was paid in 1925.

Copper, gold, and silver produced by Anaconda Copper Mining Co. from company ores, 1918–1926

Year	Copper ore treated	Copper	Silver	Gold	Dividends
	Short tons	*Pounds*	*Ounces*	*Ounces*	
1918	4, 350, 446	272, 923, 031	10, 076, 748	64, 318	------------
1919	1, 794, 358	129, 781, 031	6, 744, 262	42, 526	$9, 325, 000
1920	1, 828, 380	138, 763, 065	6, 420, 026	32, 530	6, 993, 750
1921	395, 239	32, 267, 345	2, 137, 062	8, 619	------------
1922	1, 878, 162	141, 741, 235	6, 755, 212	25, 720	------------
1923	2, 735, 534	200, 779, 688	8, 568, 607	29, 726	9, 000, 000
1924	3, 017, 417	238, 247, 038	8, 345, 841	37, 689	2, 250, 000
1925	2, 750, 736	266, 373, 956	9, 054, 741	38, 390	9, 000, 000
1926	2, 570, 162	254, 302, 568	8, 226, 724	31, 764	9, 000, 000

The Butte & Superior Mining Co. in 1926 produced 94,638 tons of copper ore, the metal content of which was as follows: Copper, 7,166,249 pounds (3.79 per cent); gold, 462 ounces; silver, 563,522 ounces; lead, 377,402 pounds; and zinc, 5,019,005 pounds. The copper content of the ore produced was a little higher than in 1925, and the copper content of the ore reserves is reported to show a little decrease. In addition to the copper produced from the copper ores mined, 1,486,822 pounds of copper was obtained from the zinc ore. At the end of 1926 the reserves of copper ore were estimated to be 70,640 tons, containing an average of 3.80 per cent copper and 6.41 ounces of silver, compared with 219,501 tons, containing an average of 4.19 per cent copper and 6.62 ounces of silver, at the end of 1925

The East Butte Copper Mining Co. produced, from its Pittsmont mine, 58,968 dry tons of ore, which averaged 5.05 per cent copper and 3.73 ounces of silver a ton. From this ore 5,955,482 pounds of copper, 219,792 ounces of silver, and 31 ounces of gold were produced, having a gross value of $486,067.57. This company reports losing money during 1926; in consequence, no dividends were reported.

Operations of East Butte Copper Mining Co. in 1926

Ore mined (dry weight), Pittsmont	short tons	58,968
Average assay value, copper	per cent	5.05
Average assay value, silver	ounces	3.73
Copper produced	pounds	5,955,482
Silver produced	ounces	219,792
Gold produced	do	31
Ore milled and shipped, Silver Plume, Colorado	short tons	53,505
Average assay value, silver	ounces	4.65
Average assay value, lead	per cent	.30
Silver produced	ounces	192,579
Lead produced	pounds	249,893
Gross value of metals shipped, Pittsmont		$486,067.57
Smelting operations adjustments, Pittsmont		42,877.54
Gross value ores and concentrates shipped, Silver Plume		108,007.75
Gross value lime rock sold		46,275.08
Other income		28,277.80
Gross income from all sources		711,505.74
Operating costs, Pittsmont		619,795.10
Operating costs, Silver Plume		124,003.98
Operating costs, lime quarry		38,289.96
Operating costs, miscellaneous		4,010.37
Maintenance of properties, East Butte		4,243.30
Total cost of operations and maintenance		790,342.71
Loss on operations		78,836.97
Depreciation copper inventory		26,519.91
Depreciation on equipment, East Butte		6,602.68
Outside exploration		19,346.50
Deficit from all operations		131,306.06
Deficit on Pittsmont operations transferred		90,849.99
Deficit on East Butte operations		40,456.07
Price per pound copper received	cents	13.821
Cost per pound copper delivered	do	16.321
Loss per pound copper	do	2.50
Average price per ounce received for silver, Pittsmont mine	do	62.77
Average price per ounce received for silver, Silver Plume	do	61.43
Average price per pound received for lead, Silver Plume	do	6.91

NEVADA

In 1926 Nevada produced 109,041,769 pounds of copper, 6.27 per cent of the total for the country, and ranked fifth among the copper-producing States. From the beginning of operations through 1926 Nevada has produced a total of 1,304,863,784 pounds, 3.48 per cent of the country's total, and also ranks fifth. The mine production of copper in Nevada in 1926 was 101,827,937 pounds. Most of the copper produced in the State has come from the Ely (Robinson) district.

Ely (Robinson) district.—The mine production in Ely district in 1926 amounted to 95,009,000 pounds, an increase from 78,627,000 pounds in 1925. Through 1926 this district has produced a total of 1,162,124,000 pounds, 3.10 per cent of the country's total, and ranks eighth among the districts of the country. The Nevada Consolidated Copper Co. produces most of the output of the district and State.

Production of metals in Ely (Robinson) district, Nevada, 1919–1926

[Mine figures]

Year	Ore	Copper produced	Average yield in copper	Gold and silver per ton of ore
	Short tons	*Pounds*	*Per cent*	*Cents*
1919	2, 273, 961	47, 871, 048	1. 05	17
1920	2, 589, 546	48, 347, 828	. 93	21
1921	400, 810	10, 282, 527	1. 28	25
1922	630, 871	22, 614, 736	1. 79	19
1923	2, 833, 674	65, 928, 279	1. 16	24
1924	3, 505, 362	73, 279, 064	1. 05	21
1925	3, 922, 770	78, 627, 308	1. 00	21
1926	4, 672, 240	95, 009, 115	1. 02	18

The Nevada Consolidated Copper Co.'s properties in Nevada produced 2,860,660 dry tons of ore that was milled. In addition, 1,499,469 dry tons of low-grade sulphide material, removed in stripping operations, was concentrated, as was also 208,143 dry tons of custom ore, making a total of 4,568,272 dry tons of concentrator ore for the year, equivalent to 12,516 tons a day. The milling cost, exclusive of depreciation and all taxes but including all other expenses, was 48.3 cents a ton for the year.

The following information regarding the operation of the Ray, Chino, and Nevada properties of the Nevada Consolidated Copper Co. is given in the report of the company for 1926. A total of 10,949,544 dry tons of ore was treated at the three branches of this company. Of this total 10,840,648 tons was concentrated and 108,896 tons was sent to the smelters direct. The average grade of the material milled was 1.268 per cent copper, and the average recovery in the form of concentrates was 86.26 per cent of the total copper content, corresponding to 21.88 pounds of copper a ton so treated. The net company production of refined copper was 231,119,539 pounds. The total ore reserves of the three branches, as shown in 1925, were 279,686,431 tons, averaging 1.52 per cent copper. In 1926 more ore was developed than was extracted. The cost of production, excluding only the Federal income tax, was 10.53 cents a pound as compared with 11.10 cents a pound in 1925. The net amount credited to surplus was $7,608,013, of which $4,687,120.68 was paid in dividends in 1926. The total net surplus is $1,527,156.52. The total dividends paid by the company are, to date, $107,359,931.70.

Metals produced at the Nevada mines of the Nevada Consolidated Copper Co., 1919–1926

Year	Ore treated	Average assay of copper	Average extraction of copper	Refined copper produced
	Short tons	*Per cent*	*Per cent*	*Pounds*
1919	2,135,425	1.599	70.49	43,971,892
1920	2,568,588	1.449	70.20	48,311,985
1921	392,645	1.49	75.23	9,362,325
1922	518,523	1.60	75.19	23,762,675
1923	2,576,388	1.31	82.90	61,573,246
1924	3,418,900	1.198	87.09	70,237,050
1925	[1] 3,234,390	[1] 1.21	92.24	73,653,886
1926	[2] 4,568,272	(3)	(3)	(3)

[1] In addition, 598,114 dry tons of porphyry sulphide material, averaging 0.684 per cent copper, was concentrated, giving a recovery in electrolytic copper of 9.63 pounds to a ton milled.

[2] Includes 208,143 tons of custom ore.

[3] Not given separately. The copper content of Ray, Nevada, and Chino production was 1.268 per cent; mill recovery, 86.26 per cent; and refined copper output, 231,119,539 pounds.

The Consolidated Coppermines Corporation in 1926 produced 6,135,018 pounds of copper, 2,910.516 ounces of gold, 27,434.159 ounces of silver, 134,591 pounds of lead, and 61,021 pounds of zinc. Of this output, 15,533 pounds of copper was obtained from the Morris Brooks mine.

Yerington district.—The mines, mill, and smelter of the Mason Valley Mines Co. were on part-time operation during 1926. There were 168,748 tons of ore from the Bluestone group and 48,083 tons of sulphide ore from Mason Valley group mined and trammed to the concentrator. The smelter handled 65,929 dry tons of marginal ore and concentrates, extracting 5,075.082 ounces of gold, 111,026.93 ounces of silver, and 5,938,360 pounds of copper. The capacity of the concentrator is being increased to 1,250 tons a day, and an improvement over 1926 operation is anticipated.

NEW MEXICO

From the beginning of operations to the end of 1926 New Mexico has produced 1,040,312,865 pounds of copper, 2.77 per cent of the country's total output of 37,541,682,651 pounds, and ranks sixth among the copper-producing States. New Mexico also ranked sixth in production for 1926, with an output of 82,848,096 pounds of blister copper, 4.76 per cent of the country's total. The Santa Rita district produces most of the copper from New Mexico, and the Chino mines of the Nevada Consolidated Mining Co. furnish most of the district output.

Central (*including Santa Rita*) *district.*—The Central district ranks ninth among the copper-producing districts in total output from the beginning of operations through 1926, with a production of 920,421,000 pounds. The production for several years is shown in the following table:

Copper produced in Central (including Santa Rita) district, New Mexico, 1919–1926, in pounds

1919	40, 359, 000	1923	54, 375, 000
1920	44, 400, 000	1924	66, 824, 000
1921	9, 138, 000	1925	68, 812, 000
1922	28, 408, 000	1926	75, 219, 000

The Nevada Consolidated Copper Co. took over the Chino and Ray mines of the Ray Consolidated Copper Co. during 1926, and in consequence much of the information contained in the annual report of the main company summarizes the operations of the Nevada, Ray, and Chino mines. This summary is given on page 601 under Nevada, the home office of the main company. The Chino branch concentrated 3,523,319 dry tons of ore during 1926, or a daily average of 9,653 tons. The cost of milling, exclusive of taxes and depreciation, was 62.6 cents a ton. Additional drilling (21,620 feet) disclosed further additions to the ore reserves. The main and material shaft, which is to be 644 feet in depth in the Estrella ore body, reached a depth of 348 feet by the end of 1926. All of the ore at the Chino mines is now being mined by power shovels at a cost of 36.4 cents a ton, excluding taxes and depreciation but including all other costs. The cost of stripping was 51.44 cents a ton.

The actual capacity of the concentrator has been brought up to 10,000 tons a day, and it is the intention of the company to increase this to 12,000 tons. Further data concerning this branch have been blanketed in the total figures for the Ray, Chino, and Nevada properties in the report of the main company, as given under Nevada (p. 601).

Metals produced by Chino mines of the Nevada Consolidated Copper Co., New Mexico, 1919–1926

Year	Ore milled	Copper content	Mill recovery	Refined copper produced
	Short tons	*Per cent*	*Per cent*	*Pounds*
1919	1, 765, 200	1. 82	65. 67	40, 488, 706
1920	1, 838, 140	1. 76	70. 67	44, 051, 849
1921	361, 660	1. 70	77. 36	9, 137, 282
1922	1, 416, 869	1. 55	66. 99	28, 406, 314
1923	2, 785, 564	1. 50	66. 34	54, 261, 228
1924	2, 706, 200	1. 59	77. 83	66, 574, 486
1925	3, 002, 700	1. 42	80. 54	67, 385, 620
1926	3, 523, 319	(1)	(1)	(1)

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[1] Not given separately. The copper content of Ray, Nevada, and Chino production was 1.268 per cent; mill recovery, 86.26 per cent; and refined copper output, 231,119,539 pounds.

Burro Mountain district.—The Burro Mountain branch of the Phelps Dodge Corporation was inactive during 1926.

Lordsburg district.—The Eighty-Five branch of the Calumet & Arizona Mining Co. produced 79,707 wet tons of ore in 1926. The production of the Lordsburg district for several years is given in the following statement:

Copper produced in Lordsburg district, New Mexico, 1919–1926, in pounds

[Mine figures]

1919	3, 516, 000	1923	4, 314, 000
1920	2, 696, 000	1924	4, 928, 000
1921	579, 000	1925	5, 064, 000
1922	3, 217, 000	1926	4, 763, 000

TENNESSEE

In 1926 Tennessee produced 18,601,586 pounds of blister copper, 1.07 per cent of the country's total, and ranked ninth among the copper-producing States. From the beginning of operations through 1926 Tennessee has produced approximately 488,144,000 pounds of copper, 1.30 per cent of the total output of the country, and ranks ninth in total production also. Tennessee is the only eastern State that has made a notable output. The entire production comes from the Ducktown district, in Polk County, in the extreme southeastern part of the State.

Copper produced in Ducktown district, Tennessee, 1919–1926

Year	Copper ore treated	Copper produced (smelter)	Average yield of copper	Gold and silver per ton of ore
	Short tons	*Pounds*	*Per cent*	*Cents*
1919	555, 018	15, 629, 454	1. 41	21
1920	589, 853	16, 727, 803	1. 42	21
1921	564, 457	15, 084, 294	1. 34	18
1922	557, 750	14, 226, 232	1. 28	15
1923	776, 477	18, 721, 932	1. 21	12
1924	714, 975	18, 251, 996	1. 28	10
1925	794, 930	19, 789, 234	1. 24	10
1926	608, 040	18, 601, 586	1. 53	12

The Burra Burra and the Eureka mines of the Tennessee Copper Co. were operated throughout the year; the London mine was closed down in October. Improvements in metallurgy made it possible to mine and treat a large tonnage of the low-grade copper ore, but a decreased output was made. In 1926 the company produced 12,566,665 pounds of copper, compared with 13,625,707 pounds in 1925. The estimated reserves of copper ore for all mines are 5,674,577 tons, of which the major portion is in the Burra Burra mine. The sulphuric-acid plant produced 354,722.41 tons of 60° acid. Four quarterly dividends of 25 cents a share, totaling $794,618.50, were paid during 1926.

Copper and sulphuric acid produced by Tennessee Copper Co., 1919–1926

Year	Ore treated	Copper	Sulphuric acid, 60° Baumé	Year	Ore treated	Copper	Sulphuric acid, 60° Baumé
	Short tons	*Pounds*	*Short tons*		*Short tons*	*Pounds*	*Short tons*
1919	413, 877	10, 414, 815	266, 627	1923	484, 324	12, 013, 988	299, 231
1920	404, 060	10, 358, 237	333, 629	1924	451, 777	[1] 12, 566, 576	247, 477
1921	302, 584	8, 018, 577	242, 743	1925	516, 964	[2] 13, 592, 606	329, 395
1922	287, 499	7, 553, 281	218, 676	1926	[3] 507, 954	12, 566, 665	354, 722

[1] Exclusive of 160,059 pounds of copper from other sources.

[2] Exclusive of 33,101 pounds of copper from other than Tennessee Copper Co. ore.

[3] Ore mined. Comparative figure for 1925 is 495,531 tons.

UTAH

The smelter production of copper in Utah increased from 242,730,986 pounds in 1925 to 259,649,158 pounds in 1926. The 1926 production represented 14.92 per cent of the total output of the country and ranked Utah as the second largest copper-producing State in that year. From the beginning of operations through 1926 Utah has produced a total of 3,457,258,308 pounds of copper, 9.21 per cent of the total for the country, and ranks fourth among the copper-producing States. Utah, like nearly all of the important copper-producing States, has one outstanding copper-producing district, the Bingham.

Bingham district.—The Bingham district was the second largest copper-producing district in the United States in 1926; it was exceeded only by the Butte district, Montana. In total production from the beginning of operations the Bingham district ranks fourth, with an output of 3,085,658,000 pounds. The outstanding producer in the Bingham district is the Utah Copper Co.

Copper produced in Bingham district, Utah, 1919–1926, in pounds

[Mine figures]

1919	116, 697, 000	1923	216, 037, 000
1920	110, 670, 000	1924	236, 181, 000
1921	28, 011, 000	1925	227, 612, 000
1922	91, 762, 000	1926	248, 975, 000

The mines of the Utah Copper Co. in 1926 produced and shipped to the mills 13,880,100 tons of ore, a daily average of 38,028 tons; this ore contained an average of 1.01 per cent copper, or 20.2 pounds a ton. Of the total ore milled, the Magna plant treated 7,454,200 tons and the Arthur plant 6,425,900 tons. During the year 6 steam shovels were converted to electric shovels, so that at the end of the year all of the 23 shovels in use at the property were electrically operated. At the Arthur plant further equipment in the fine-crushing department was added. The material shipped to the smelter contained 244,783,285 pounds of copper, of which 244,026,905 pounds was in concentrates and 756,380 pounds was in precipitates from mine waters. After allowance was made for losses in smelting and refining, the net production of refined copper was 234,173,625 pounds. The average cost of producing copper, after depreciation of plant and equipment and all fixed and general expenses were charged and credit was given for gold, silver, and miscellaneous earnings, was 7.94 cents a pound, compared with 8.43 cents in 1925. During 1926, 64,000,000 tons of ore was developed, and the reserves at the end of the year, as they will be mined, amounted to approximately 564,000,000 tons of ore averaging 1.10 per cent copper; ore mined up to the end of 1926 is 145,774,651 tons, making a total of 710,000,000 tons of ore mined and to be mined. Four quarterly dividends totaling $5.25 a share were paid during the year and amounted to $8,528,572.50; these were subdivided into $6,975,560.06 in actual dividends and $1,553,012.44 in capital distribution.

Metals produced by Utah Copper Co. from ore milled, 1919–1926

Year	Ore milled	Copper content	Mill recovery	Copper[1]	Gold and silver per pound of copper[2]	Dividends (includes capital distribution)
	Short tons	*Per cent*	*Per cent*	*Pounds*	*Cents*	
1919	5,538,700	1.26	78.46	105,088,740	0.83	$9,746,940
1920	5,556,800	1.16	81.38	101,897,758	.81	9,746,940
1921	1,220,700	1.16	83.87	24,511,593	[2] 1.15	4,061,225
1922	4,364,251	1.26	80.00	84,777,712	[2] 1.45	3,248,980
1923	11,167,800	1.12	80.96	195,142,919	[2] 1.313	6,497,960
1924	12,126,600	1.07	85.94	214,592,733	[2] 1.206	6,497,960
1925	12,538,300	1.02	86.96	214,162,139	[2] 1.36	6,904,083
1926	13,889,100	1.01	87.01	234,173,625	[2] 1.36	8,528,572

[1] Net production of refined copper, not copper content of concentrates.
[2] Includes miscellaneous income 1921 to 1926. Comparative figure for 1920 is 2.09 cents.

Cost of mining, milling, and concentrating copper ore by Utah Copper Co., 1919–1926

Year	Ore (short tons)	Cost per ton			
		Mining	Transportation	Milling	Total
1919	5,538,700	$0.4900	$0.3040	$1.2062	$2.0002
1920	5,556,800	.4823	.2591	1.2472	1.9886
1921	1,220,700	.4998	.1921	1.1679	1.8598
1922	4,364,251	.3833	.1612	.8417	1.3862
1923	11,167,800	.3488	.1088	.6116	1.0692
1924	12,126,600	.3605	.1308	.5990	1.0903
1925	12,538,300	.3373	.1151	.5382	.9906
1926	13,880,100	.3139	.1019	.4843	.9001

The copper production of the Ohio Copper Co., of Utah, decreased from 6,271,556 pounds in 1925 to 4,963,761 pounds in 1926. This reduction in output caused a corresponding increase in cost of production from 8.3216 cents a pound in 1925 to 8.9985 cents in 1926. The company paid a 3 per cent dividend, amounting to $86,454 in 1926.

Copper production of the Ohio Copper Co., of Utah, in 1926

	Copper produced	Cost per pound	Price per pound	Profit per pound	Operating profits
	Pounds	*Cents*	*Cents*	*Cents*	
First quarter	1,244,278	8.9564	13.7996	4.8432	$60,628.47
Second quarter	1,555,742	7.8893	13.5936	5.7043	88,729.76
Third quarter	1,053,878	10.1002	13.9774	3.8772	40,861.40
Fourth quarter	1,109,863	9.5941	13.4997	3.9056	43,437.81
	4,963,761	8.9985	13.7058	4.7073	[1] 233,657.44

[1] After adding miscellaneous income and deducting taxes, insurance, and other miscellaneous charges, net profits were $140,261. After allowances for depreciation and depletion the balance transferred to surplus was $33,017.

Tintic district.—The Tintic district produced 5,226,000 pounds of copper in 1926, the largest output since 1918. From the beginning of operations through 1926 this district has yielded 172,606,000 pounds of copper. The production for several years is shown as follows:

Copper produced in Tintic district, Utah, 1919–1926, in pounds

[Mine figures]

1919	3, 251, 000	1923	3, 033, 000
1920	3, 003, 000	1924	3, 076, 000
1921	1, 570, 000	1925	4, 627, 000
1922	2, 295, 000	1926	5, 226, 000

REFINERY PRODUCTION

The refinery output of copper in the United States in 1926 was made by 11 plants; 8 of these employed the electrolytic method and 3 employed the furnace process on Lake Superior copper. The Calumet & Hecla Consolidated Copper Co. usually employs both methods, but the electrolytic plant has not been in commission since December, 1922, as the silver content of the copper is not enough to pay for its recovery.

Six of the large electrolytic refineries are on the Atlantic seaboard, and the three Lake refineries are on the Great Lakes; only two plants are west of the Great Lakes—one at Great Falls, Mont., and one at Tacoma, Wash. In addition to these refineries, there are numerous plants in different parts of the country that make a considerable output from old copper, brass, and other alloys of copper. The output of the regular refining plants is in the form of casting, Lake, and electrolytic copper.

Refinery production from ores of domestic and foreign origin is shown in the table on page 608. The domestic figure is the one which is to be compared with smelter production from domestic sources, the main difference being the time factor explained in the introduction to this report, by which the figures for refinery production include copper that was mined some three months earlier than the beginning of the calendar year and smelted probably one or two months earlier.

CASTING AND PIG COPPER

Blister copper that is low in precious metals and free enough from impurities for certain uses is refined by the furnace process and ordinarily cast into ingots. This copper is usually unfit for uses requiring a high-grade copper, such as electric transmission, brass manufacture, and rolling, but is suitable for copper castings, and a large part of it is put to that use. Lake copper excepted, a comparatively small percentage of the copper output carries so small a content of precious metals that, together with the added value of electrolytic copper, it will not more than pay for the electrolytic refining of the copper; consequently the output of casting copper is small. Some blister or pig copper low in precious metals has been exported without further treatment and is probably consumed without electrolytic refining. Some of the districts produced a rather high grade of blister copper carrying a small amount of precious metals, and it is found profitable to market some of this copper without electrolytic refining. During 1926 the production of furnace-refined new casting copper from domestic and foreign sources amounted to 8,138,860 pounds. No unrefined pig and best select copper was reported as produced in 1926.

LAKE COPPER

Lake copper, as the term is used in this report, means the output of the Lake smelters. Ordinarily a considerable proportion of this output is refined electrolytically, but most of the electrolytically refined Lake copper is mixed with furnace-refined copper or is sold as some brand of Lake copper. Since December, 1922, however, the electrolytic plant of the Calumet & Hecla Consolidated Copper Co. has not been in commission because the silver content of the copper was not sufficient to pay for its recovery. The production of Lake copper in 1926 amounted to 172,377,304 pounds.

ELECTROLYTIC COPPER

In 1926 the production of electrolytic copper from primary materials of domestic origin amounted to approximately 1,553,041,000 pounds and from materials of foreign origin to 588,933,000 pounds, and, in addition, 163,062,000 pounds were produced from secondary sources—a total electrolytic production of 2,305,036,000 pounds for the year, compared with 2,190,978,000 pounds for 1925.

REFINED COPPER

The total output of new refined copper in 1926 was 2,322,485,000 pounds, an increase of 117,912,000 pounds from that in 1925. Adding to the new refined copper produced from domestic and foreign sources the imports of refined copper gives the new copper made available for consumption during the year. In this table is shown also the production of secondary copper by the regular refineries but not the output of plants that treat only secondary material, which is shown in the table on page 609.

Primary and secondary copper produced by regular refining plants in the United States and imported, 1921–1926, in pounds

	1921	1922	1923	1924	1925	1926
Primary:						
Domestic [1]—						
Electrolytic	506, 532, 984	766, 944, 836	1, 302, 454, 492	1, 499, 223, 447	1, 533, 995, 439	1, 553, 041, 424
Lake	100, 918, 001	122, 545, 126	137, 691, 306	145, 333, 227	138, 029, 764	172, 372, 304
Casting	1, 740, 393	15, 180, 723	24, 019, 197	29, 657, 925	10, 870, 144	5, 883, 433
Pig and best select	222, 878	------------	------------	------------	------------	------------
	609, 414, 256	904, 670, 685	1, 464, 164, 995	1, 674, 214, 599	1, 682, 895, 347	1, 731, 297, 161
Foreign [1]—						
Electrolytic	336, 088, 209	345, 641, 677	509, 873, 512	577, 100, 034	516, 632, 530	588, 932, 788
Casting and best select	5, 275, 350	5, 203, 597	5, 797, 109	8, 761, 377	5, 045, 947	2, 255, 427
Refinery production, new copper	950, 777, 815	1, 255, 515, 959	1, 979, 835, 616	2, 260, 076, 010	2, 204, 573, 824	2, 322, 485, 376
Imports refined copper	69, 249, 281	103, 143, 142	[2] 160, 711, 227	145, 909, 968	99, 773, 546	170, 565, 766
Total new refined copper made available	1, 020, 027, 096	1, 358, 659, 101	2, 140, 546, 843	2, 405, 985, 978	2, 304, 347, 370	2, 493, 051, 142
Secondary:						
Electrolytic	82, 017, 382	100, 792, 685	85, 297, 052	104, 281, 430	140, 349, 541	163, 061, 465
Casting	24, 467, 951	45, 217, 857	46, 141, 409	50, 536, 678	58, 010, 653	62, 056, 941
	106, 485, 333	146, 010, 542	131, 438, 461	154, 818, 108	198, 360, 194	225, 118, 406
Grand total	1, 126, 512, 429	1, 504, 669, 643	2, 271, 985, 304	2, 560, 804, 086	2, 502, 707, 564	2, 718, 169, 548

[1] The separation of refined copper into metal of domestic and foreign origin is only approximate, as an accurate separation at this stage of manufacture is not possible.

[2] The figures of imports of refined copper from Chile in 1923 reported by the Chile Exploration Co. have been included in place of the figures of the Bureau of Foreign and Domestic Commerce for Chile, which undoubtedly are very low.

If the output of plants treating only secondary material is added to the production of the regular refining companies, the contribution from plants in the United States to the world's supply of copper for 1926 is found to be 3,282,000,000 pounds.

SECONDARY COPPER

Under secondary copper is considered material recovered from remelting old copper, copper scraps, and copper recovered from the treatment of copper alloys or alloys that are treated without the separation of the copper. A canvass of plants producing secondary copper has been made by J. P. Dunlop, of the Bureau of Mines, and the following figures are taken from his report:

Secondary copper recovered in the United States in 1926, with imports and exports of scrap brass and copper, in short tons

Copper as metal	200, 100
Copper in alloys other than brass	81, 600
	281, 700
Copper from new scrap (not including brass)	55, 000
Copper from old scrap (not including brass)	226, 700
	281, 700
Brass scrap remelted:	
New clean scrap	125, 000
Old scrap	158, 000
	283, 000
Copper content of brass scrap (averaging about 70 per cent copper):	
New clean scrap	87, 500
Old scrap	110, 600
	198, 100
Total copper produced from secondary sources (including copper content of brass scrap):	
From new scrap	142, 500
From old scrap	337, 300
	479, 800
Imports of scrap brass	4, 311
Imports of scrap copper	5, 501
Exports of brass ingots, scrap, and old	25, 132
Exports of scrap copper	9, 713

Refined copper from secondary sources produced in the United States, 1917–1926, in pounds

1917	766, 800, 000	1922	671, 800, 000
1918	705, 340, 000	1923	821, 800, 000
1919	574, 380, 000	1924	776, 600, 000
1920	624, 920, 000	1925	840, 420, 000
1921	434, 600, 000	1926	959, 600, 000

COPPER SULPHATE

The production of hydrous copper sulphate or bluestone by the copper refineries of the United States in 1926 was 33,363,264 pounds, having a copper content of 8,498,000 pounds, as against 26,514,875 pounds, having a copper content of 6,754,000 pounds, in 1925.

STOCKS

Stocks of copper in the United States, January 1, 1920–1927, in pounds

Year	Refined copper	Blister and material in process of refining	Year	Refined copper	Blister and material in process of refining
1920	631,000,000	273,000,000	1924	264,000,000	432,000,000
1921	659,000,000	465,000,000	1925	243,000,000	393,000,000
1922	459,000,000	283,000,000	1926	124,000,000	432,000,000
1923	216,000,000	361,000,000	1927	146,000,000	455,000,000

IMPORTS AND EXPORTS

The imports of unmanufactured copper in 1926 amounted to 779,441,803 pounds. This exceeds by 10,628,072 pounds the previous record figures of 768,813,731 pounds in 1924. Large quantities of unrefined copper were imported from the Belgian Congo and also from Canada, Chile, Mexico, Peru, and Spain for refining in the United States. From Canada and Chile the imports of this class of copper decreased, but from the other countries mentioned they increased. Large quantities of ore and concentrates were received from Canada, Chile, Cuba, Mexico, and Spain. Imports of this class from Canada and Spain showed a gain, while the imports from Chile, Cuba, and Mexico showed large decreases. The only important imports of refined copper were those received from Chile; they were much larger than in 1925. Virtually all of the ore and blister produced in Chile but not refined there is sent to the United States for treatment.

Copper (unmanufactured) imported into the United States, 1924–1926, in pounds

[General imports]

Country	Ore (copper content)	Concentrates (copper content)	Matte and regulus (copper content)	Unrefined black copper and copper in bars, pigs, or other forms	Refined in bars, plates, rods, or other forms	Old and clippings for remanufacture	Composition metal, copper chief value
1924							
Africa:							
British South	--------	--------	--------	672,560	--------	--------	--------
Portuguese—							
East	70,378	--------	--------	34,330,735	--------	--------	--------
Other	--------	--------	--------	90,487,936	--------	--------	--------
Australia	--------	--------	--------	1,234,050	--------	--------	--------
Bolivia	262,167	--------	--------	--------	--------	--------	--------
Canada	27,350,280	1,396,411	35,468	51,121,265	1,109,769	2,328,947	150,161
Chile	46,584,230	1,352,352	145,030	124,283,121	141,247,852	35,840	--------
Cuba	11,969,920	11,429,580	--------	--------	--------	521,909	--------
France	592,511	6,048	13,642	3,376,036	633,645	9,588	1,312
Germany	--------	37,318	21,159	44,990	17,200	59,043	14,862
Mexico	2,987,404	22,687,382	48,500	69,963,716	477,252	10,317	--------
Peru	1,731,222	46,185	13,222	74,951,579	--------	5,946	--------
Spain	10,312,123	284,785	--------	16,505,918	--------	--------	--------
United Kingdom	155,647	922,254	497,101	2,812,324	2,409,884	128,373	21,180
Venezuela	--------	1,908,480	--------	--------	--------	--------	--------
Other	3,150,336	1,666,461	279,356	1,244,604	14,366	609,107	21,392
	105,166,218	41,737,256	1,053,478	471,028,834	145,909,968	3,709,070	208,907
Total value	$12,807,225	$4,693,029	$125,288	$59,462,150	$18,556,174	$402,260	$43,170

Copper (unmanufactured) imported into the United States, 1924–1926, in pounds—Continued

Country	Ore (copper content)	Concentrates (copper content)	Matte and regulus (copper content)	Unrefined black copper and copper in bars, pigs, or other forms	Refined in bars, plates, rods, or other forms	Old and clippings for remanufacture	Composition metal, copper chief value
1925							
Africa:							
British South	65,055	38,950					
Portuguese—							
East	383,444	39,897		92,769,600			
Other		10,785					
Australia	900		227,231	224,415			
Canada	41,571,234	2,449,488	96,548	50,500,684	10,110	5,680,470	10,012
Chile	44,554,953	215,560	265,955	59,800,141	96,170,761	285,823	
Cuba	5,985,806	25,176,103				2,091,015	57,549
France	229,939	472,400	87,448	100,439			
Germany	70,810	128,312		1,160	24,640	1,391,205	241
Mexico	2,220,156	24,771,676	80,000	71,777,809		104,454	20,430
Peru	593,071	82,582	178,750	72,324,746		1,129	
Spain	8,897,949			14,419,651			
United Kingdom	407,187	107,626	32,259	3,898,193	22,460	520,741	112
Venezuela				1,068,971			4,732
Other	2,661,832	460,243	764,797	12,447,691	3,545,575	353,629	13,873
	107,642,336	53,953,622	1,732,988	379,333,500	99,773,546	10,428,466	106,949
Total value	$13,582,361	$6,491,514	$212,725	$48,870,358	$13,831,407	$1,188,711	$12,086
1926							
Africa:							
British South				52,601,821		2,967	
Portuguese—							
East		20,271		83,314,732	910,206		
Other				449,642		150	
Australia	248,646		140,720				
Canada	47,609,027	7,963,626	107,655	44,961,092	685	6,002,507	135,503
Chile	33,074,184	848,861	202,836	31,365,100	166,872,641	343,351	
Cuba	5,433,042	14,471,381				1,926,861	10,980
France	1,146,285	37,300	42,114	1,131,955			
Germany	107,742	623,836		216,325	59,387	205,171	70,273
Mexico	2,862,187	18,821,148	971,943	82,320,581	210,874	68,624	
Peru	1,066,055	358,562	99,945	93,907,544		6,579	
Spain	13,480,257			24,783,133			
United Kingdom	270,617	183,644	250,783	27,743,879	2,069,115	890,199	111,244
Venezuela	276	1,345,408				1,667	
Other	1,417,040	76,440	313,046	1,002,493	442,858	1,553,513	153,274
	106,715,358	44,750,477	2,129,042	443,798,297	170,565,766	11,001,589	481,274
Total value	$13,452,075	$5,351,557	$261,443	$56,101,041	$23,335,640	$1,114,436	$63,769

Copper (unmanufactured) imported into the United States, 1919–1926, in pounds

[General imports]

1919	429,387,594	1923	676,473,338
1920	485,670,691	1924	768,813,731
1921	350,472,611	1925	652,971,407
1922	541,013,220	1926	779,441,803

In 1926 the United States exported more copper to the United Kingdom than to any other country. France stood second in order of importance and Germany third. In 1925, Germany was first, with the United Kingdom second and France third.

Copper exported from the United States, 1925 and 1926, in pounds

Country	Ore, concentrates, composition metal, and unrefined copper (copper content)	Refined, in bars, ingots, or other forms	Old and scrap	Pipes and tubes	Plates and sheets	Wire (except insulated)	Insulated wire and cable	Rods	Other manufactures of copper
1925									
Belgium	78,710	90,950,918	55,683	----	572,357	14,090	6,242	717,060	1,099
Canada	249,309	24,300,632	4,066,687	1,340,360	1,631,351	1,962,493	1,406,713	7,431,159	1,654,410
China	----	12,133,124	505,476	1,513	41,937	13,442	1,129,137	143	19,821
Denmark	----	1,639,533	----	----	1,556	3,951	17,382	2,818,405	9,315
France	224,598	145,809,549	373,539	59	448,222	2,573	189,603	785,943	5,517
Germany	1,046,118	229,291,382	4,188,651	----	3,935,655	90,975	57,991	1,119,902	173,106
India (British)	----	3,644,858	223,818	4,394	1,643,612	57,923	82,557	----	39,806
Italy	----	126,472,202	398,772	----	656,791	370	17,336	280,469	23,833
Japan	1,604	8,493,760	5,688	1,978	7,548	12,319	48,163	----	4,354
Netherlands	237,547	92,279,396	220,282	4,412	1,546,956	3,620	24,273	313,992	6,671
Norway	----	1,829,841	----	2,243	----	89,885	70,519	1,602,075	1,950
Spain	----	7,077,977	349,956	----	280	43,797	217,056	63,011	19,182
Sweden	----	29,105,773	----	----	3,200	724	9,097	280,115	13,804
Switzerland	----	1,688,373	57,902	----	----	500	8,703	----	1,931
United Kingdom	----	183,752,066	1,151,127	12,625	414,523	92,790	1,079,650	34,254,775	142,082
Other	1,207	9,596,053	507,880	1,416,441	1,301,295	9,276,127	13,452,571	4,602,793	1,339,938
	1,839,093	968,065,437	12,105,461	2,784,025	12,205,283	11,665,579	17,816,993	54,269,842	3,456,819
Total value	$232,636	$140,220,827	$1,555,999	$697,057	$2,331,190	$2,094,108	$4,900,264	$8,098,281	$1,035,458
1926									
Belgium	----	82,058,980	18,632	----	44,852	868	6,782	22,852	(1)
Canada	163,043	15,288,339	2,811,469	2,286,220	1,578,837	765,636	1,749,467	11,517,562	
China	----	8,167,056	36,520	15,852	26,628	69,510	280,205	----	
Denmark and Faroe Islands	----	867,701	----	----	1,225	67,382	28,291	1,343,675	
France	109,673	175,150,816	365,933	57	818,086	163,324	134,872	2,783,828	
Germany	4,610,828	153,360,480	8,745,244	2,360	504,581	37,753	4,515	----	
India (British)	----	4,415,087	22,820	3,429	222,871	625,433	195,536	----	
Italy	----	82,957,238	33,030	120	336,721	40,966	7,488	111,031	
Japan (including Chosen)	2,295	37,343,661	5,043,581	90	9,460	656,635	65,357	1,590	
Netherlands	----	64,286,443	572,846	5,057	38,042	338,030	48,961	112,181	
Norway	----	951,333	----	1,313	----	335	23,485	932,458	
Spain	----	9,656,520	----	153	----	146	15,800	1,503	
Sweden	112,323	24,711,844	----	49	3,087	4,462	15,858	----	
Switzerland	----	----	----	----	----	2,944	43,925	----	
United Kingdom	466,864	180,320,237	1,424,703	20,417	464,157	1,444,833	792,457	19,733,655	
Other	126	16,588,793	351,334	918,101	983,643	8,822,871	15,139,530	8,230,072	
	5,465,152	856,124,528	19,426,112	3,253,218	5,032,190	13,041,128	18,552,529	44,790,407	(1)
Total value	$611,630	$121,231,224	$2,178,330	$839,953	$1,075,143	$2,244,235	$4,816,128	$6,856,722	$1,350,391

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[1] Figures for quantity not recorded.

Copper exported from the United States, 1919–1926

Year	Pounds		Total value
	Metallic[1]	Total	
1919	515, 595, 019	516, 627, 775	$117, 417, 055
1920	623, 158, 489	624, 053, 701	127, 468, 606
1921	628, 415, 714	628, 804, 750	85, 351, 928
1922	742, 755, 957	743, 039, 888	103, 874, 007
1923	828, 854, 827	829, 314, 002	129, 219, 975
1924	1, 116, 775, 136	1, 116, 915, 484	156, 645, 684
1925	1, 082, 369, 439	1, 084, 208, 532	161, 165, 820
1926 [2]	960, 220, 112	965, 685, 264	139, 853, 365

[1] Exclusive of ore, concentrates, and composition metal, and in 1923 to 1926 of unrefined copper, figures for which are not separable from those for ore and concentrates.

[2] Exclusive of "Other manufactures of copper," valued at $1,350,391; quantity not recorded.

Copper sulphate (blue vitriol) exported from the United States, 1919–1926

Year	Pounds	Value	Year	Pounds	Value
1919	9, 140, 673	$928, 291	1923	2, 290, 905	$130, 213
1920	3, 783, 409	306, 899	1924	2, 988, 039	142, 626
1921	3, 582, 933	217, 491	1925	6, 139, 344	285, 870
1922	5, 250, 556	256, 432	1926	4, 798, 620	231, 175

Brass and bronze exported from the United States, 1925 and 1926

	1925		1926	
	Pounds	Value	Pounds	Value
Ingots, scrap, and old	96, 378, 288	$9, 889, 153	50, 264, 811	$4, 944, 277
Bars and rods	7, 016, 721	1, 120, 939	3, 290, 611	553, 190
Plates and sheets	958, 332	238, 655	1, 464, 216	331, 717
Pipes and tubes	2, 823, 427	725, 898	3, 557, 218	921, 519
Pipe fittings, valves, faucets, etc	3, 705, 831	2, 036, 881	3, 435, 398	1, 828, 056
Plumbers' brass goods	------------	------------	439, 492	231, 985
Builders' hardware of brass or bronze	1, 095, 641	690, 960	(1)	815, 062
Wire of brass or bronze	1, 182, 172	400, 201	1, 266, 715	406, 876
Other brass and bronze manufactures	7, 001, 056	3, 461, 767	(1)	3, 641, 248
	------------	18, 564, 454	------------	13, 673, 930

[1] Figures for quantity not recorded.

Unmanufactured brass exported from the United States, 1919–1926

[Ingots,[1] bars, rods, plates, and sheets]

Year	Pounds	Value	Year	Pounds	Value
1919	7, 770, 671	$2, 310, 561	1923	3, 465, 739	$703, 503
1920	5, 810, 733	1, 671, 608	1924	4, 529, 257	740, 993
1921	2, 874, 762	741, 110	1925 [1]	7, 975, 053	1, 359, 594
1922	3, 660, 340	635, 449	1926 [1]	4, 754, 827	884, 907

[1] Exclusive of ingots in 1925 and 1926, figures for which are not separable from those for "scrap and old."

CONSUMPTION

As calculated by the method shown in the following table, the quantity of new copper consumed in a year is actually the amount of new copper withdrawn from available supply on domestic account. This method of computation is not accurate, as figures on consumers' stocks are not available and can not be taken into account. In addition, much copper withdrawn on domestic account is later exported in manufactured forms. The domestic withdrawals in 1926 total 1,570,000,000 pounds. These are considerably higher than withdrawals in 1925 and, except for those of 1918, are the largest recorded.

New refined copper withdrawn from total year's supply on domestic account, 1919–1926, in pounds

	1919	1920	1921	1922
Total supply of new copper	1,805,306,801	1,634,908,644	1,020,027,096	1,358,659,101
Stock at beginning of year	180,000,000	631,000,000	659,000,000	459,000,000
Total available supply	1,985,306,801	2,265,908,644	1,679,027,096	1,817,659,101
Copper exported [1]	439,835,229	553,070,086	609,038,352	705,025,268
Stock at end of year	631,000,000	659,000,000	459,000,000	216,000,000
	1,070,835,229	1,212,070,086	1,068,038,352	921,025,268
Withdrawn on domestic account	914,471,572	1,053,838,558	610,988,744	896,633,833

	1923	1924	1925	1926
Total supply of new copper	2,140,546,843	2,405,985,978	2,304,347,370	2,493,051,142
Stock at beginning of year	216,000,000	264,000,000	243,000,000	124,000,000
Total available supply	2,356,546,843	2,669,985,978	2,547,347,370	2,617,051,142
Copper exported [2]	792,073,512	1,072,243,414	1,022,335,279	900,914,935
Stock at end of year	264,000,000	243,000,000	124,000,000	146,000,000
	1,056,073,512	1,315,243,414	1,146,335,279	1,046,914,935
Withdrawn on domestic account	1,300,473,331	1,354,742,564	1,401,012,091	1,570,136,207

[1] Includes unrefined black blister and converter copper (bars, pigs, and other forms) and refined in ingots, bars, rods, or other forms.

[2] Includes refined copper in ingots, bars, rods, or other forms, but excludes small quantity of unrefined black blister for which figures are not separable from those for ore and concentrates.

Adding the 959,600,000 pounds of secondary copper and copper in alloys produced during the year to the 1,570,000,000 pounds of new refined copper withdrawn on domestic account gives a total of about 2,529,600,000 pounds of new and old copper that was available for domestic consumption.

USES

There are no official data available showing the quantity of copper that entered the different industries.

The following table shows the copper cast in different forms in 1926. It will be noted that the total is not the same as the production of refined copper:

Copper cast in different forms in the United States in 1926

Form	Pounds	Percentage
Wire bars	1,654,000,000	66.24
Ingots	277,000,000	11.09
Cakes	277,000,000	11.09
Cathodes	189,000,000	7.57
Other forms	100,000,000	4.01
	2,497,000,000	100.00

PRICES

Reports to the Bureau of Mines from copper-selling agencies in the United States indicate that 2,751,000,000 pounds of copper were delivered to domestic and foreign purchasers in 1926 at an average price of 14 cents a pound, or 0.2 cent a pound less than the average price obtained in 1925. The average price for copper in 1926 is considerably below the average for the 20-year period ended in 1926. The bright features of the market are the many new uses being found for copper at present prices, the breaking of all records for consumption, and the lack of interest in substitutes.

Price per pound of copper, 1900–1926, in cents [10]

1900	16. 6	1907	20. 0	1914	13. 3	1921	12. 9
1901	16. 7	1908	13. 2	1915	17. 5	1922	13. 5
1902	12. 2	1909	13. 0	1916	24. 6	1923	14. 7
1903	13. 7	1910	12. 7	1917	27. 3	1924	13. 1
1904	12. 8	1911	12. 5	1918	24. 7	1925	14. 2
1905	15. 6	1912	16. 5	1919	18. 6	1926	14. 0
1906	19. 3	1913	15. 5	1920	18. 4		

Average monthly prices at New York per pound of electrolytic copper, 1919–1926, in cents, as reported by the American Metal Market Co.

Month	1919	1920	1921	1922	1923	1924	1925	1926
January	20. 05	19. 02	12. 85	13. 60	14. 66	12. 59	14. 79	13. 94
February	16. 91	18. 61	12. 79	12. 97	15. 50	12. 85	14. 54	14. 14
March	15. 01	18. 36	12. 23	12. 84	16. 96	13. 65	14. 17	13. 98
April	15. 40	18. 54	12. 54	12. 71	16. 81	13. 36	13. 45	13. 81
May	16. 00	18. 28	12. 83	13. 29	15. 63	12. 93	13. 50	13. 77
June	17. 65	17. 97	12. 76	13. 71	14. 88	12. 49	13. 47	13. 79
July	21. 71	18. 61	12. 35	13. 90	14. 59	12. 57	14. 07	14. 00
August	22. 22	18. 44	11. 76	13. 96	14. 05	13. 31	14. 57	14. 26
September	21. 95	18. 04	12. 10	13. 88	13. 60	13. 08	14. 46	14. 19
October	21. 50	16. 30	12. 75	13. 80	12. 81	13. 04	14. 42	14. 10
November	19. 96	14. 39	13. 16	13. 79	12. 89	13. 70	14. 48	13. 79
December	18. 48	13. 48	13. 67	14. 22	12. 98	14. 32	13. 96	13. 44
Average	18. 90	17. 50	12. 65	13. 56	14. 61	13. 16	14. 16	13. 93

Average monthly quoted prices at New York per pound of electrolytic copper, 1919–1926, in cents, as reported by the Engineering and Mining Journal

Month	1919	1920	1921	1922	1923	1924	1925	1926
January	([a])	18. 918	12. 597	13. 465	14. 510	12. 401	14. 709	13. 822
February	16. 763	18. 569	12. 556	12. 864	15. 355	12. 708	14. 463	13. 999
March	14. 856	18. 331	11. 976	12. 567	16. 832	13. 515	14. 004	13. 859
April	15. 246	18. 660	12. 438	12. 573	16. 663	13. 206	13. 252	13. 706
May	15. 864	18. 484	12. 742	13. 111	15. 440	12. 772	13. 347	13. 599
June	17. 610	18. 065	12. 697	13. 575	14. 663	12. 327	13. 399	13. 656
July	21. 601	18. 576	12. 170	13. 654	14. 321	12. 390	13. 946	13. 924
August	22. 319	18. 346	11. 634	13. 723	13. 822	13. 221	14. 490	14. 174
September	21. 755	18. 144	11. 948	13. 748	13. 323	12. 917	14. 376	14. 062
October	21. 534	15. 934	12. 673	13. 632	12. 574	12. 933	14. 300	13. 862
November	19. 758	14. 257	13. 035	13. 598	12. 727	13. 635	14. 353	13. 576
December	18. 295	13. 138	13. 555	14. 074	12. 823	14. 260	13. 866	13. 302
Average	18. 691	17. 456	12. 502	13. 382	14. 421	13. 024	14. 042	13. 795

[a] No market.

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[10] Weed, W. H., Copper Handbook, vol. 11, pp. 1339, 1343, for years 1900 to 1903. U. S. Geological Survey computations for electrolytic copper since 1904. For 1916 and later years average price all marketable grades.

GOLD, SILVER, COPPER, AND LEAD IN SOUTH DAKOTA

(MINE REPORT)

By Chas. W. Henderson

SUMMARY

In 1926, there was only one important producing lode mine—the Homestake—in South Dakota, but two placers and one other lode mine made small outputs. The following table shows the number of producing mines, tons of ore produced, and recovered content of metals in South Dakota from 1917 to 1926, inclusive.

Mine production of gold, silver, copper, and lead in South Dakota, 1917–1926 [1]

Year	Mines producing			Ore (short tons)	Gold (lode and placer)		Silver (lode and placer)	
	Lode	Placer	Total		Fine ounces	Value	Fine ounces	Value
1917	23	7	30	1,868,310	356,244.77	$7,364,233	186,765	$153,894
1918	16	6	22	1,782,563	317,598.18	6,565,337	159,202	159,202
1919	9	3	12	1,330,368	235,249.57	4,863,040	116,493	130,472
1920	3	4	7	1,356,189	226,224.23	4,676,470	90,795	98,966
1921	3	6	9	1,725,685	319,524.95	6,605,167	112,464	112,464
1922	3	3	6	1,751,454	315,297.99	6,517,788	118,760	118,760
1923	5	--------	5	1,665,439	309,905.05	6,406,306	95,844	78,592
1924	4	--------	4	1,674,720	295,930.24	6,117,421	86,548	57,987
1925	3	--------	3	1,590,079	289,747.10	5,989,604	96,133	66,716
1926	2	2	4	1,415,785	279,528.93	5,778,376	82,186	51,284

Year	Copper		Lead		Total value
	Pounds	Value	Pounds	Value	
1917	10,707	$2,923	68,081	$5,855	$7,526,905
1918	64,806	16,007	53,408	3,792	6,744,338
1919	---------	---------	32,547	1,725	4,995,237
1920	---------	---------	12,812	1,025	4,776,461
1921	---------	---------	4,000	180	6,717,811
1922	---------	---------	---------	---------	6,636,548
1923	---------	---------	---------	---------	6,484,898
1924	---------	---------	---------	---------	6,175,408
1925	---------	---------	---------	---------	6,056,320
1926	---------	---------	---------	---------	5,829,660

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[1] For total production of gold and silver in South Dakota, by years, see Mineral Resources, 1913, pt. 1, p. 42, and Mineral Resources, 1922, pt. 1, p. 194.

Gold and silver produced at placer mines in South Dakota, 1917–1926

Year	Gold		Silver		Total value
	Fine ounces	Value	Fine ounces	Value	
1917	44.70	$924	4	$3	$927
1918	20.85	431			431
1919	19.16	396	1	1	397
1920	27.91	577	5	5	582
1921	89.44	1,849	7	7	1,856
1922	87.99	1,819	7	7	1,826
1923–1925					
1926	6.43	133			133

The prices given in the table that follows are those at which the values for metals in this report have been calculated. The silver prices for 1917 and 1919 are dealers' buying price, New York; for 1918, average price as stated by the Bureau of the Mint; for 1920 to 1922, New York market price for domestic silver only; for 1923, average price under the Pittman Act, from January 1 to June 2, for domestic silver, and average New York price for all silver after that period; for 1924 and later years, average New York price for bar silver. The copper, lead, and zinc prices are weighted averages, for each year, of all grades of primary metal sold by producers.

Prices of silver, copper, lead, and zinc, 1917–1926

Year	Silver	Copper	Lead	Zinc	Year	Silver	Copper	Lead	Zinc
	Per fine ounce	*Per pound*	*Per pound*	*Per pound*		*Per fine ounce*	*Per pound*	*Per pound*	*Per pound*
1917	$0.824	$0.273	$0.086	$0.102	1922	$1.00	$0.135	$0.055	$0.057
1918	1.00	.247	.071	.091	1923	.82	.147	.070	.068
1919	1.12	.186	.053	.073	1924	.67	.131	.080	.065
1920	1.09	.184	.080	.081	1925	.694	.142	.087	.076
1921	1.00	.129	.045	.050	1926	.624	.140	.080	.075

MINING AND METALLURGIC INDUSTRY

At the Homestake mine, at Lead, Lawrence County, from which most of the production of South Dakota has come since 1875, production was continuous during 1926. For many years this mine has been the largest producer of gold in the United States. Its metallurgists have contributed much to the data on crushing with stamps, plate amalgamation, and cyanidation of sands and slimes. Of the many pioneer cyanidation mills in South Dakota, such as the Lundberg-Dorr & Wilson, Mogul, Golden Reward, New Reliance, Trojan, and Wasp No. 2, none has been in operation since 1923, and most of them have been idle since 1918. Several mills were dismantled in 1926. These mills were operated on the oxidized ores of the flat-lying siliceous gold ore bodies in the sedimentaries (dolomites) of the Lead region. At various periods attempts have been made to treat the sulphide or "blue" ores, from which the oxidized (brown) ore bodies are derived. The Golden Reward Co. in 1916 built a roaster at its Astoria shaft for the preliminary treatment of the sulphide ores. Others experimented with these refractory sulphide ores in various ways, sometimes with success when mixed with oxidized ores. The Bureau of Mines has published a paper[1] on the treatment of the "blue ores," giving the results of experiments made in 1926 by the Rare and Precious Metals Experiment Station (Reno, Nev.) of the United States Bureau of Mines.

From near Galena, Lawrence County, in the Galena and Bear Butte districts, has come production of lead-silver-gold ores carrying a little copper. Nearly all the production of lead and copper, indicated in the 10-year table for Lawrence County, came from near Galena. Part of the lead in 1919 came from the Belle Eldridge mine, in Whitewood Creek. Placer gold from Lawrence County has come from Tinton and from Whitewood Creek.

Custer County has produced placer gold from near Mystic and lead-silver-gold ore from near Keystone. The lode mine production shown in the 10-year table for Custer County came from the Spokane mine, 7 miles northwest of Keystone and 15 miles east of Custer.

Pennington County has produced copper-silver-gold ores from near Hill City and Rochford and gold-silver ores from Keystone. Placer gold has come from Battle, Castle, and Rapid Creeks.

Gold and silver bullion produced at mills in South Dakota by amalgamation, 1917–1926

Year	Ore treated	Gold in bullion	Silver in bullion	Quicksilver used
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*
1917	1,677,623	228,018.51	61,759	13,199
1918	1,628,630	202,219.02	55,932	12,252
1919	1,192,588	146,815.80	41,595	9,000
1920	1,274,944	148,018.30	42,863	8,660
1921	1,620,588	214,003.69	60,604	22,500
1922	1,663,525	218,247.50	58,806	7,500
1923	1,652,337	216,907.61	60,624	10,725
1924	1,674,720	203,174.24	52,920	7,625
1925	1,589,711	195,865.49	49,812	7,500
1926	1,415,785	187,119.66	47,284	5,625

Gold and silver bullion produced at mills in South Dakota by cyanidation, 1917–1926

Year	Material treated			Gold in bullion	Silver in bullion	Sodium cyanide used
	Crude ore	Sands and slimes	Total			
	Short tons	*Short tons*	*Short tons*	*Fine ounces*	*Fine ounces*	*Pounds*
1917	189,960	1,619,457	1,809,417	127,560.01	119,292	384,938
1918	152,732	1,565,809	1,718,541	115,234.34	97,849	370,218
1919	136,893	1,157,945	1,294,838	86,017.98	72,662	284,653
1920	81,135	1,245,419	1,326,554	78,062.93	44,456	339,122
1921	49,047	1,620,588	1,669,635	105,360.12	50,811	395,228
1922	87,929	1,620,699	1,708,628	96,962.50	59,947	387,683
1923	13,087	1,626,234	1,639,321	92,960.74	35,135	361,900
1924		1,647,344	1,647,344	92,756.00	33,628	361,650
1925		1,567,555	1,567,555	92,528.61	32,005	347,242
1926		1,402,472	1,402,472	92,402.84	34,902	299,672

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[1] Leaver, Edmund S., and Woolf, Jesse A., Cyanide Extraction of Gold and Silver Associated with Arsenic and Antimony in Ores: Tech. Paper 423, Bureau of Mines, 1928, pp. 23–52.

Mine production of metals from South Dakota crude ore shipped to smelters, 1917–1926

Year	Crude ore	Gold	Silver	Copper	Lead
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*
1917	727	621. 55	5, 710	10, 707	68, 081
1918	901	122. 47	4, 525	64, 806	11, 536
1919	247	2, 386. 11	1, 615	----------	3, 792
1920	110	115. 09	3, 471	----------	12, 812
1921	157	71. 70	1, 042	----------	4, 000
1922	----------	----------	----------	----------	----------
1923	15	36. 70	85	----------	----------
1924	----------	----------	----------	----------	----------
1925	368	1, 353. 00	14, 316	----------	----------
1926	----------	----------	----------	----------	----------

REVIEW BY COUNTIES

CUSTER COUNTY

Mine production of gold, silver, and lead in Custer County, S. Dak., 1917–1926

Year	Mines producing		Ore	Gold (lode and placer)	Silver (lode and placer)	Lead	Total value
	Lode	Placer					
			Short tons		*Fine ounces*	*Pounds*	
1917	1	--------	21	$4	182	7, 176	$771
1918	1	--------	300	31	896	41, 872	3, 900
1919	1	--------	440	27	483	25, 962	1, 944
1920	--------	--------	----------	----------	----------	----------	----------
1921	--------	3	----------	582	1	----------	583
1922–1925	--------	--------	----------	----------	----------	----------	----------
1926	--------	1	----------	30	----------	----------	30

After a shutdown lasting for several years the Spokane Silver & Lead Co. in 1926 resumed operations at its Spokane-Cuyahoga group, 7 miles northwest of Keystone. The 200-foot shaft was unwatered and sunk another 125 feet. Drifts were driven on the 300-foot level. General repairs were made on the buildings and a power plant was installed. On the property is a 100-ton concentration plant which the company proposes to remodel.

LAWRENCE COUNTY[2]

Mine production of gold, silver, copper, and lead in Lawrence County, S. Dak., 1917–1926

Year	Mines producing	Ore	Gold (lode and placer)	Silver (lode and placer)	Copper	Lead	Total value
		Short tons		*Fine ounces*	*Pounds*	*Pounds*	
1917	24	1, 868, 143	$7, 360, 266	186, 436	736	60, 905	$7, 519, 328
1918	[a] 17	1, 781, 661	[a] 6, 565, 151	158, 108	2, 996	11, 536	[a] 6, 724, 818
1919	[a] 11	1, 329, 928	4, 863, 013	116, 010	----------	6, 585	4, 993, 293
1920	7	1, 356, 189	4, 676, 470	90, 795	----------	12, 812	4, 776, 461
1921	3	1, 725, 685	6, 603, 318	112, 457	----------	4, 000	6, 715, 955
1922	4	1, 751, 414	6, 515, 969	118, 753	----------	----------	6, 634, 722
1923	4	1, 665, 437	6, 406, 206	95, 844	----------	----------	6, 484, 798
1924	1	1, 670, 300	6, 091, 100	86, 354	----------	----------	6, 148, 957
1925	2	1, 590, 069	5, 988, 570	96, 133	----------	----------	6, 055, 286
1926	2	1, 415, 775	5, 777, 545	82, 186	----------	----------	5, 828, 829

[a] Revised figures.

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[2] For information on the geology of this county see Irving, J. D., "Ore deposits of the northern Black Hills;" Chapter in Contributions to Economic Geology: U. S. Geol. Survey Bull. 225, 1904, pp. 123–140; Irving, J. D., and Emmons, S. F., Economic Resources of the Northern Black Hills: U. S. Geol. Survey Prof. Paper 26, 1904, pp. 53–212.

HOMESTAKE MINE

The annual report of the superintendent of the Homestake Mining Co.[3] for the year ended December 31, 1926, says:

> The mine and mills of the company were operated continuously throughout the year.
>
> The engineers report as follows: Development drifts driven 10,991 feet; development raises driven 4,195 feet.
>
> The B. & M. No. 2 shaft is completed to a point 36 feet below the 900-foot level.
>
> There are 744,889 tons of ore broken down and remaining in the stopes.
>
> There are 15,264,399 tons of ore blocked out and remaining in the mine.
>
> The mechanical department is now housed in well lighted and ventilated buildings located near the Ellison shaft with direct railroad connection and accessible to all departments.
>
> Crushing and concentrating machinery for the production of wolframite concentrates from tungsten ore was installed during the early part of the year in the building formerly used as the regrinding plant and has been in continuous operation since April 1.
>
> The coal mine has supplied the company's fuel requirements throughout the year.
>
> April 9, 1876, when Moses Manuel and partners located the Homestake lode claim, marks the beginning of the Homestake mine.

Ore milled, receipts, and dividends, Homestake mine, 1917–1926

Year	Ore milled	Receipts for bullion product		Dividends
		Total	Per ton	
	Short tons			
1917	1,677,623	$6,619,573.94	$3.9458	$1,959,048
1918	1,628,630	5,916,890.31	3.6330	1,506,960
1919	1,192,588	4,346,115.79	3.6443	1,130,220
1920	1,274,944	4,410,193.73	3.4591	------------
1921	1,620,588	6,299,780.38	3.8873	502,320
1922	1,663,485	6,285,317.56	3.7784	879,060
1923	1,652,337	6,400,078.42	3.8733	1,506,960
1924	1,670,300	6,126,349.99	3.6678	1,756,120
1925	1,589,701	5,999,073.50	3.7737	1,758,120
1926	1,415,775	5,811,943.90	4.1051	1,758,120

The total value of the product of the Homestake Mining Co. from 1875 to 1926 is $206,356,703.24, and the amount paid in dividends is $50,585,044.29.

The Homestake mine is opened by three main shafts, the deepest of which is 2,400 feet deep, and by 64 miles of adits, drifts, and crosscuts. In 1926 the company completed 10,991 feet of drifts, 4,195 feet of raises, and 7,121 feet of diamond drilling. The amalgamating mills consist of the following: At Terraville, the Pocahontas 160-stamp mill with 2,592 square feet of amalgamating plates; the "Terraville Ball" mill, equipped with a Hardinge ball mill, a Dorr classifier, and plates; at Lead, the South mill, with 120 stamps, 2,860 square feet of plates, rod mills, tube mills, a ball mill, Dorr classifiers, and cone classifiers; the Amicus mill, with 240 stamps, 3,780 square feet of plates, tube mills, Dorr and cone classifiers; the

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[3] For description of geology see Paige, Sidney, "The geology of the Homestake mine": Econ. Geology, vol. 18, 1923, pp. 205–237; Geology of the Region Around Lead, S. Dak., and Its Bearing on the Homestake Ore Body: U. S. Geol. Survey Bull. 765, 1924, 56 pp.; Central Black Hills, S. Dak.: U. S. Geol. Survey Geol. Atlas, Folio 219, 1925. Hosted, J. O., and Wright, L. B., "Geology of the Homestake ore bodies and the Lead area, South Dakota": Eng. and Min. Jour.-Press, vol. 115, May 5, 1923, pp. 793–799; May 12, 1923, pp. 836–843.

"Tungsten" mill, with 5 stamps, 300 square feet of plates, a special ball mill, and 6 concentrating tables. The sands from the Pocahontas and "Terraville Ball" mills go to the No. 2 sand plant at Blacktail, and the sands from the South, Amicus, and Tungsten mills go to No. 1 sand plant, at Lead. Slimes from all the stamp mills and the "Terraville Ball" mill go to the slime plant, at Deadwood.

The mining methods used at the Homestake mine in 1925 have been described by Ross and Wayland.[4] It is probable that no radical change in mining methods was made in 1926.

PENNINGTON COUNTY

Mine production of gold, silver, and copper in Pennington County, S. Dak., 1917–1926

Year	Mines producing		Ore	Gold (lode and placer)	Silver (lode and placer)	Copper	Total value
	Lode	Placer					
			Short tons		*Fine ounces*	*Pounds*	
1917	3	2	146	$3,963	147	9,971	$6,806
1918	2	2	602	[1] 155	198	61,810	[1] 15,620
1919–1920							
1921		3		1,267	6		1,273
1922	1	1	40	1,819	7		1,826
1923	1		2	100			100
1924	3		4,420	26,321	194		26,451
1925	1		10	1,034			1,034
1926	1		10	801			801

[1] Revised figures.

R. E. Nelson reports that in 1926 a 60-foot shallow open cut was made on the Doctor lode near Redfern, following similar work during recent years on an ore body of quartz in slate. The quartz, when crushed under a 1,000-pound stamp and concentrated on a Nelson concentrator, produces gold which is sold for jewelry. On the Bessie B. lode, near Mystic, 200 feet of development work was done. On the "O. K." claim, near Redfern, open-cut work was done for assessment. Development work was done at the Gold lode, west of Hill City. The Columbia shaft, at Keystone, was retimbered. Diamond drilling was done in the Rochford district.

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[4] Ross, A. J. M., and Wayland, R. G., "Mining methods at the Homestake": Min. and Met., vol. 7, No. 229, January, 1926, p. 21.

GOLD, SILVER, AND COPPER IN WYOMING

(MINE REPORT)

By Chas. W. Henderson

SUMMARY

No production from either lode or placer mines in Wyoming was made in 1924, 1925, and 1926. Mine production of gold, silver, and copper in Wyoming since 1914 is given in the table that follows.

Mine production of gold, silver, and copper in Wyoming, 1914–1926 [1]

Year	Ore (short tons)	Gold	Silver		Copper		Total value
			Fine ounces	Commercial value	Pounds	Value	
1914	423	$5,006	116	$64	17,421	$2,317	$7,387
1915	4,216	14,592	840	426	447,246	78,268	93,286
1916	8,376	20,566	5,524	3,635	2,610,622	642,213	666,414
1917	6,335	3,762	3,415	2,814	2,027,857	553,605	560,181
1918	2,870	871	965	965	852,777	210,636	212,472
1919	798	84	151	169	139,900	26,021	26,274
1920	----------	----------	----------	----------	----------	----------	----------
1921	50	62	111	111	10,000	1,290	1,463
1922	24	1,207	57	57	4,296	580	1,844
1923	584	296	254	208	111,280	16,358	16,862
1924–1926	----------	----------	----------	----------	----------	----------	----------

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[1] For yearly output, 1842–1914, see Mineral Resources, 1914, pt. 1, pp. 248-249, 1916.

The prices given in the table that follows are those at which the values for metals in this report have been calculated. The silver prices for 1917 and 1919 are dealers' buying price, New York; for 1918, average price as stated by the Bureau of the Mint; for 1920 to 1922, New York market price for domestic silver only; for 1923, average price under the Pittman Act, from January 1 to June 2, for domestic silver, and average New York price for all silver after that period; for 1924 and later years, average New York price for bar silver. The copper, lead, and zinc prices are weighted averages, for each year, of all grades of primary metal sold by producers.

Prices of silver, copper, lead, and zinc, 1917–1926

Year	Silver	Copper	Lead	Zinc	Year	Silver	Copper	Lead	Zinc
	Per fine ounce	*Per pound*	*Per pound*	*Per pound*		*Per fine ounce*	*Per pound*	*Per pound*	*Per pound*
1917	$0.824	$0.273	$0.086	$0.102	1922	$1.00	$0.135	$0.055	$0.057
1918	1.00	.247	.071	.091	1923	.82	.147	.070	.068
1919	1.12	.186	.053	.073	1924	.67	.131	.080	.065
1920	1.09	.184	.080	.081	1925	.694	.142	.087	.076
1921	1.00	.129	.045	.050	1926	.624	.140	.080	.075

REVIEW BY COUNTIES AND DISTRICTS

ALBANY COUNTY

Albany district.—Development work was done on the Radio prospect, a deposit of allanite, at Albany.

Centennial district.[1]—An amalgamation-gravity concentration-flotation mill was built at the Cliff property.

Douglas Creek district.—No work was done at the Rambler mine, formerly a producer of gold, silver, copper, platinum, and palladium; the main shaft has caved in. Assessment work was done on various lode prospects in the district. Sluice boxes were installed and sampling of placer ground in Moore's Gulch was done.

Laramie Peak district (*Esterbrook*).[2]—Development work was done at the Esterbrook and Three Cripples prospects.

Tie Siding district.—No work was done at the Copper Hill group, from which in the past some shipments have been made of native copper and oxidized copper ores, found in a limestone bed lying on Sherman Hill granite.

CARBON COUNTY

Upper North Platte district (*Encampment*).[3]—Repair work on the buildings was done at the Three Forks group, north of Columbine, Colo.

CROOK COUNTY

No water was available for sluicing in the Hurricane district, in Wyoming, near Tinton, S. Dak.

FREMONT COUNTY

Atlantic City or South Pass City district.[4]—Hand drilling on the Ellen Mc No. 2 claim opened a showing of gold ore for which a small Huntington mill, with amalgamation plates, was built on Willow Creek. The Carissa mine was kept unwatered by pumping. At the "1914" or Sullivan group, the shaft was retimbered in 1926; during 1924 and 1925 until fire destroyed the buildings in September, 1925, this property was under examination and option by the Homestake Mining Co. of South Dakota. The vein is developed by an incline shaft and an adit on the 100-foot level. The shaft follows the vein on its dip 74° northwest from surface to the 100-foot level, and 69° from the 100-foot level to 83 feet below the 200-foot level. On the 100-foot level, there are 100 feet of drifts southwest of shaft and 77 feet northeast of shaft; also 87 feet of crosscut. On the 200-foot level there are 180 feet of drifts northeast and 25 feet southwest of shaft and 25 feet of crosscut. At the Hidden Hand group some development work was done in preparation for operation of the 10-stamp mill on the property. The property is opened by a 110-foot shaft and 640 feet of crosscuts and drifts.

Copper Mountain district.—All properties were idle in 1926.

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[1] For geology see Hess, F. L., "Platinum near Centennial, Wyo.;" Contributions to Economic Geology, 1925: U. S. Geol. Survey Bull. 780, 1926, pp. 127–135.

[2] For geology see Spencer, A. C., The Atlantic Gold District and the North Laramie Mountains, Fremont, Converse, and Albany Counties, Wyo.: U. S. Geol. Survey Bull. 626, 1916, 85 pp.

[3] For geology see Spencer, A. C., The Copper Deposits of the Encampment district, Wyo.: U. S. Geol Survey Prof. Paper 25, 1904, 107 pp.

[4] For geology of the district see Spencer, A. C., The Atlantic Gold District and the North Laramie Mountains, Fremont, Converse, and Albany Counties, Wyo.: U. S. Geol. Survey Bull. 626, 1916, 85 pp.

GOSHEN COUNTY

Muskrat district.—Assessment work was done at the Green Hope claim.

LARAMIE COUNTY

Silver Crown district.—A compressor plant was installed at the Rambler-Silver Crown group for the purpose of examining the property.

PLATTE COUNTY

Hartville district.[5]—No copper ore, such as had been shipped intermittently from 1882 to 1923, was shipped in 1926 from the Sunrise iron mine, the source at present and for many years in the past of a large part of the iron ore used by the Colorado Fuel & Iron Co.'s steel plant, at Pueblo, Colo. During 1915, 1916, 1917, and 1918 a very considerable production of copper-silver ore in addition to the iron ore was shipped from this mine.

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[5] For geology see Ball, S H., "Copper deposits of the Hartville uplift, Wyo."; Contributions to Economic Geology, 1906: U. S. Geol Survey Bull. 315, 1907, pp. 93-107; Smith, W. S. T., U. S. Geol. Survey Geol. Atlas, Folio 91, 1903.

GOLD, SILVER, COPPER, LEAD, AND ZINC IN ARIZONA

(MINE REPORT)

By C. N. Gerry [1]

SUMMARY

In 1926 the mines of Arizona produced gold, silver, copper, lead and zinc valued at $113,536,288, an increase of $398,090 compared with 1925. The average prices of silver, copper, lead, and zinc in 1926 were less than those in 1925; there were, however, good increases in total quantity and value of both gold and zinc. The Calumet & Arizona, United Verde Extension, New Cornelia, United Verde, Inspiration, Magma, Miami Copper, Arizona Commercial, Night Hawk Leasing, Tom Reed, Midland Copper, and Iron Cap mining companies paid dividends amounting to $17,178,977. In addition, the Phelps Dodge Corporation, operating mines at Bisbee and Morenci, Ariz., and also in New Mexico and Mexico, paid $2,500,000; and the Nevada Consolidated Copper Co., operating mines at Ray, Ariz., McGill, Nev., and Santa Rita, N. Mex., paid $4,687,121.

The quantity of all metals, except lead, increased. The decline in lead was due to the large decrease in the shipments of lead ore from the Copper Queen property of the Phelps Dodge Corporation. Although there were increases in the quantity of silver and copper, the total values decreased as a result of the decline in the average prices of these metals. The average value of the metals recovered from the ore, old tailings, slag, etc., decreased from $5.40 a ton in 1925 to $5.06 in 1926 and the average value in gold and silver from 44 cents to 42 cents a ton.

Judging from the value of the metals produced in different counties, the greater part of the output came from Gila, Yavapai, and Cochise Counties. On account of its increased copper output, Gila County took the lead in 1926. The value of metals recovered from mines in Pinal, Pima, and Greenlee Counties was also important on account of their large copper production. Gold was recovered chiefly from Cochise, Yavapai, Mohave, and Pima Counties; there was a large and general increase in the output of the metal. Silver came largely from Yavapai, Cochise, and Pinal Counties; there was a fair increase in Pinal County. Lead and zinc were recovered chiefly from Cochise County; Yavapai County also was a large zinc producer and Pima and Pinal Counties contributed much lead.

During the decade from 1917 to 1926 most of the gold was recovered from dry and siliceous ore and from copper ore; it was about evenly divided between those sources. Gold from siliceous ore has decreased, so that the output in 1926 was only about one-third that of 1918. On the other hand, gold from copper ore has increased; in 1926 it was about 70 per cent greater than it was in 1917. Gold was also saved from lead ore and from mixed ores; very little came from placers. Silver had its source chiefly in copper ore during the 10-year period, with smaller amounts from siliceous ore and lead ore. Silver from copper ore has been increasing, while that from dry and siliceous ore has been decreasing.

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[1] The valuable assistance of Paul Luff and B. N. Lowry, of the Bureau of Mines, is acknowledged.

The prices given in the table that follows are those at which the values for metals in this report have been calculated. The silver prices for 1917 and 1919 are dealers' buying price, New York; for 1918, average price as stated by the Bureau of the Mint; for 1920 to 1922, New York market price for domestic silver only; for 1923, average price under the Pittman Act, from January 1 to June 2, for domestic silver, and average New York price for all silver after that period; for 1924 and later years, average New York price for bar silver. The copper, lead, and zinc prices are weighted averages, for each year, of all grades of primary metal sold by producers.

Prices of silver, copper, lead, and zinc, 1917–1926

Year	Silver	Copper	Lead	Zinc	Year	Silver	Copper	Lead	Zinc
	Per fine ounce	*Per pound*	*Per pound*	*Per pound*		*Per fine ounce*	*Per pound*	*Per pound*	*Per pound*
1917	$0.824	$0.273	$0.086	$0.102	1922	$1.00	$0.135	$0.055	$0.057
1918	1.00	.247	.071	.091	1923	.82	.147	.070	.068
1919	1.12	.186	.053	.073	1924	.67	.131	.080	.065
1920	1.09	.184	.080	.081	1925	.694	.142	.087	.076
1921	1.00	.129	.045	.050	1926	.624	.140	.080	.075

Mine production of gold, silver, copper, lead, and zinc in Arizona, 1917–1926

Year	Mines producing		Ore, old tailings, etc. (short tons)	Gold		Silver	
	Lode	Placer		Fine ounces	Value	Fine ounces	Value
1917	452	32	15,770,193	245,173.83	$5,068,193	6,983,913	$5,754,744
1918	456	13	19,038,486	262,919.43	5,435,027	6,686,152	6,686,152
1919	324	15	13,727,403	217,997.72	4,506,413	5,266,605	5,898,598
1920	310	8	14,920,478	231,528.65	4,786,122	5,355,303	5,837,280
1921	178	37	5,455,030	141,753.41	2,930,303	2,469,394	2,469,394
1922	285	33	10,746,045	170,479.98	3,524,134	4,531,864	4,531,864
1923	317	24	17,015,178	296,109.23	6,121,121	7,343,742	6,021,868
1924	266	9	19,820,505	235,995.74	4,878,465	6,649,276	4,455,015
1925	368	18	20,927,382	201,740.92	4,170,355	7,257,868	5,036,961
1926	362	21	22,382,685	234,010.97	4,837,436	7,381,027	4,605,761

Year	Copper		Lead		Zinc		Total value
	Pounds	Value	Pounds	Value	Pounds	Value	
1917	712,166,891	$194,421,561	23,465,445	$2,018,028	20,894,860	$2,131,276	$209,393,802
1918	764,855,874	188,919,401	12,503,689	887,762	2,269,643	206,538	202,134,880
1919	538,100,844	100,086,757	10,203,078	540,763	1,717,000	125,341	111,157,872
1920	558,256,302	102,719,160	14,599,765	1,167,981	1,457,296	118,041	114,628,584
1921	185,034,194	23,869,411	6,541,433	294,364	-----------	-----------	29,563,472
1922	400,043,128	54,005,822	15,070,894	828,899	210,624	12,006	62,902,725
1923	618,928,602	90,982,504	16,291,548	1,140,408	519,103	35,299	104,301,200
1924	677,752,013	88,785,514	18,642,314	1,491,385	-----------	-----------	99,610,379
1925	713,355,129	101,296,428	23,876,017	2,077,213	7,332,116	557,241	113,138,198
1926	723,296,051	101,261,447	23,258,274	1,860,662	12,946,423	970,982	113,536,288

GOLD

In 1926 the mine production of gold in Arizona increased 16 per cent, as a result of the large shipments of gold bullion from the Katherine mine, the increased shipments of ore from the Shattuck Denn property, and the increase in gold from copper ore mined at the United Verde property. Of the total output of gold 16.8 per cent was recovered from ore treated in gold and silver mills, 23.7 per cent was recovered from ore and old tailings concentrated, and 58.6 per cent was from crude ore shipped for smelting. Ores treated by amalgamation yielded gold valued at $31,450, and ores treated by cyanidation, $780,700. Concentrates yielded gold valued at $1,147,614, against $945,582 in 1925. The chief gold-producing districts were the Warren district, Cochise County, and the Verde district, Yavapai County, both of which produced copper ores, the San Francisco and Union Pass districts, Mohave County, both of which yielded siliceous gold ores, and the Ajo district, Pima County, which produced copper ore.

Of the mines yielding gold the United Verde Copper Co. reported the largest output, the Copper Queen at Bisbee was second, and the Calumet & Arizona at Bisbee, the Katherine near Kingman, the New Cornelia at Ajo, the Tom Reed at Oatman, the Shattuck Denn at Bisbee, the Magma at Superior, the United Verde Extension at Jerome, and the Old Dominion at Globe followed.

SILVER

In 1926 the mines of Arizona not only produced an increased quantity of silver but exceeded all past records. The silver production of the State was more than 7,000,000 ounces in each of the four years, 1916, 1923, 1925, and 1926. The increase of nearly 2 per cent in quantity in 1926 was due to the increased shipments of copper ore from the Magma property, the increase in silver recovered from copper ore mined at the Calumet & Arizona property, and the increase in shipments of silver ore from the Reymert mine near Superior, Pinal County.

The largest gain in silver was reported in Pinal County and the largest decline in Mohave County. Bullion from gold and silver ores contained 50,014 ounces of silver recovered by cyanidation and 1,026 ounces recovered by amalgamation. Concentrates yielded 26.3 per cent of the total output of silver and crude ore shipped to smelters 71.7 per cent.

Of the total silver 71.3 per cent came from the ore of the United Verde, Magma, Calumet & Arizona, Copper Queen, Shattuck Denn, and United Verde Extension, each of which produced more than 300,000 ounces. Other mines that yielded more than 150,000 ounces of silver each were the New Cornelia, Old Dominion, and Bunker Hill properties.

COPPER

The mine production of copper in Arizona in 1926 was 723,296,051 pounds, 1.4 per cent more than in 1925, and has been exceeded in only one year—1918—when the record was nearly 765,000,000 pounds. From 1904 to 1926, inclusive, the State produced 5,191,288 short tons of copper, and in 1926 the output exceeded that of Utah, the State next in order, by nearly 466,000,000 pounds. The large increase in the copper output from the New Cornelia property more than offset the large decreases from the Copper Queen and Ray properties. There were also large increases in copper from the Morenci group of the Phelps Dodge Corporation and from the Miami property in Gila County. The average sales price of copper for the year 1926 used in this report is 14 cents a pound, a decrease from 14.2 cents in 1925. Of the total copper produced in the State in 1926, 57 per cent was obtained from concentrates, 40 per cent from crude ore smelted, and 3 per cent from ore leached, etc. Of the output from crude ore smelted Yavapai County yielded 53.4 per cent and Cochise County 36.4 per cent. The copper from ore milled came mainly from Gila, Pinal, Pima, and Greenlee Counties. The low-grade disseminated ores in Cochise, Pima, Pinal, and Gila Counties yielded 323,525,198 pounds of copper, compared with 310,953,547 pounds in 1925. Similar low-grade copper deposits were worked in Greenlee County, so that the total production from the disseminated deposits in Arizona in 1926 was 380,103,874 pounds. In 1925 these ores altogether produced 363,959,478 pounds of copper.

Nine properties, each yielding more than 40,000,000 pounds, produced nearly 89 per cent of the total quantity of copper. The United Verde was first, followed by the Copper Queen, Inspiration, New Cornelia, Ray, Phelps Dodge property at Morenci, Miami, United Verde Extension, and Calumet & Arizona mines. Other mines that produced more than 2,000,000 pounds of copper each were the Magma, Old Dominion, Arizona Commercial, Iron Cap, Shattuck Denn, and Christmas.

LEAD AND ZINC

In 1926 the mine production of lead in Arizona decreased more than 2 per cent. The large decrease in the shipments of lead ore from the Copper Queen property of the Phelps Dodge Corporation more than offset the large increases in lead from mines near Pantano, Pima County, and the increase in the shipments of lead-zinc ore from the property of the Aravaipa Mining Corporation in Graham County.

The largest yield of lead was in silver-lead ore from the Shattuck Denn and Copper Queen mines at Bisbee, in lead-zinc ore from the Calumet & Arizona mine, also at Bisbee, and in lead ore from the Hilltop mine at Hilltop, all in Cochise County. These four properties yielded 54 per cent of the total lead output. Other large producers of lead were the Lone Mountain mine in Pima County, the Grand Central tailing dump in Cochise County, and the property of the Aravaipa Mining Corporation in Graham County.

The mine production of zinc in Arizona in 1926 increased 76.6 per cent as a result of the increased shipments of zinc ore from the Copper King mine in Yavapai County, owned by the Arizona Hillside Development Co. The Calumet & Arizona and Arizona Hillside properties yielded 76 per cent of the total zinc. Other producers were the Arizona Premier, Aravaipa, Mystery, and Golconda mines.

Mine production of gold, silver, copper, lead, and zinc in Arizona, 1925 and 1926, by counties

1925

County	Ore, old tailings, etc. (short tons)	Gold					Silver (lode and placer)	
		Lode		Placer		Total value		
		Fine ounces	Value	Fine ounces	Value		Fine ounces	Value
Cochise	2, 593, 876	67, 443. 31	$1, 394, 177			$1, 394, 177	2, 316, 531	$1, 607, 673
Gila	8, 512, 562	8, 990. 06	185, 841			185, 841	628, 625	436, 266
Graham	161	5. 81	120			120	417	289
Greenlee	1, 528, 431	3, 927. 52	81, 189			81, 189	141, 559	98, 242
Maricopa	14, 943	1, 031. 16	21, 316	6. 00	$124	21, 440	1, 958	1, 359
Mohave	73, 736	29, 103. 46	601, 622			601, 622	187, 387	130, 047
Pima	3, 367, 586	14, 719. 01	304, 269	6. 10	126	304, 395	272, 947	189, 426
Pinal	3, 286, 347	10, 689. 71	220. 976			220, 976	890, 322	617, 883
Santa Cruz	3, 586	65. 50	1, 354			1, 354	46, 595	32, 337
Yavapai	1, 544, 507	65, 154. 64	1, 346, 866	113. 73	2, 351	1, 349, 217	2, 762, 143	1, 916, 927
Yuma	1, 647	404. 32	8, 358	80. 59	1, 666	10, 024	9, 384	6, 512
	20, 927, 382	201, 534. 50	4, 166, 088	206. 42	4, 267	4, 170, 355	7, 257, 868	5, 036, 961

County	Copper		Lead		Zinc		Total value
	Pounds	Value	Pounds	Value	Pounds	Value	
Cochise	146, 468, 392	$20, 798, 512	18, 707, 288	$1, 627, 534	6, 745, 392	$512, 650	$25, 940, 546
Gila	175, 613, 783	24, 937, 157	263, 658	22, 938	189, 440	14, 398	25, 596, 600
Graham	191	27	41, 740	3, 631			4, 067
Greenlee	59, 464, 187	8, 443, 914	4, 721	411			8, 623, 756
Maricopa	6, 020	855	51, 000	4, 437			28, 091
Mohave	37, 051	5, 261	1, 532, 256	133, 306	174, 703	13, 277	883, 513
Pima	74, 783, 386	10, 619, 241	897, 057	78, 044	23, 750	1, 805	11, 192, 911
Pinal	102, 858, 322	14, 605, 882	574, 546	49, 986			15, 494, 727
Santa Cruz	38, 780	5, 507	1, 021, 591	88, 878	14, 365	1, 092	129, 168
Yavapai	154, 017, 340	21, 870, 462	510, 893	44, 448	184, 466	14, 019	25, 195, 073
Yuma	67, 677	9, 610	271, 267	23, 600			49, 746
	713, 355, 129	101, 296, 428	23, 876, 017	2, 077, 213	7, 332, 116	557, 241	113, 138, 198

1926

County	Ore, old tailings, etc. (short tons)	Gold					Silver (lode and placer)	
		Lode		Placer		Total value		
		Fine ounces	Value	Fine ounces	Value		Fine ounces	Value
Cochise	2, 605, 782	75, 684. 38	$1, 564, 535	5. 42	$112	$1, 564, 647	2, 299, 600	$1, 434, 951
Coconino	26	. 24	5			5	31	19
Gila	9, 850, 680	10, 296. 14	212, 840			212, 840	605, 447	377, 799
Graham	2, 599	10. 30	213			213	1, 265	789
Greenlee	1, 555, 182	4, 287. 72	88, 635	8. 71	180	88, 815	127, 757	79, 720
Maricopa	2, 627	661. 68	13, 678	32. 89	680	14, 358	5, 395	3, 367
Mohave	106, 422	40, 549. 86	838, 240	9. 14	189	838, 429	115, 632	72, 154
Pima	3, 430, 263	18, 536. 19	383, 177	13. 06	270	383, 447	300, 272	187, 370
Pinal	3, 227, 217	10, 393. 32	214, 849			214, 849	1, 111, 018	693, 275
Santa Cruz	3, 557	64. 82	1, 340			1, 340	34, 538	21, 552
Yavapai	1, 595, 826	72, 167. 76	1, 491, 840	227. 65	4, 706	1, 496, 546	2, 770, 949	1, 729, 072
Yuma	2, 504	1, 019. 60	21, 077	42. 09	870	21, 947	9, 123	5, 693
	22, 382, 685	233, 672. 01	4, 830, 429	338. 96	7, 007	4, 837, 436	7, 381, 027	4, 605, 761

Mine production of gold, silver, copper, lead, and zinc in Arizona, 1925 and 1926, by counties—Continued

1926—Continued

County	Copper		Lead		Zinc		Total value
	Pounds	Value	Pounds	Value	Pounds	Value	
Cochise	141, 302, 669	$19, 782, 374	16, 283, 062	$1, 302, 645	6, 147, 070	$461, 030	$24, 545, 647
Coconino	5, 804	812					836
Gila	177, 785, 539	24, 889, 975	187, 778	15, 022			25, 495, 636
Graham	2, 922	409	739, 571	59, 166	1, 144, 338	85, 826	146, 403
Greenlee	63, 969, 891	8, 955, 785	1, 093	88			9, 124, 408
Maricopa	24, 158	3, 382	266, 251	21, 300			42, 407
Mohave	90, 394	12, 655	759, 945	60, 796	1, 669, 524	125, 214	1, 109, 248
Pima	85, 432, 999	11, 960, 620	2, 256, 916	180, 553			12, 711, 990
Pinal	99, 140, 869	13, 879, 722	1, 027, 255	82, 180			14, 870, 026
Santa Cruz	119, 912	16, 788	736, 611	58, 929			98, 609
Yavapai	155, 368, 073	21, 751, 530	731, 614	58, 529	3, 985, 491	298, 912	25, 334, 589
Yuma	52, 821	7, 395	268, 178	21, 454			56, 489
	723, 296, 051	101, 261, 447	23, 258, 274	1, 860, 662	12, 946, 423	970, 982	113, 536, 288

Ore, old tailings, etc., sold or treated, lode mines producing, and average value of ore, etc., in Arizona, 1925–26, by counties

County	Ore, old tailings, etc. (short tons)		Lode mines producing		Average value per ton in all metals		Average value per ton in gold and silver	
	1925	1926	1925	1926	1925	1926	1925	1926
Cochise	2, 593, 876	2, 605, 782	53	49	[1] $9. 94	$9. 31	$1. 16	$1. 15
Coconino		26		1		32. 15		. 92
Gila	8, 512, 562	9, 850, 680	32	34	3. 01	2. 59	. 07	. 06
Graham	161	2, 599	3	3	25. 26	56. 33	2. 54	. 39
Greenlee	1, 528, 431	1, 555, 182	5	5	[1] 5. 63	5. 37	. 12	. 11
Maricopa	14, 943	2, 627	8	14	1. 87	15. 88	1. 52	6. 49
Mohave	73, 736	106, 422	57	60	11. 98	10. 42	9. 92	8. 55
Pima	3, 367, 586	3, 430, 263	47	42	3. 32	3. 71	. 15	. 17
Pinal	3, 286, 347	3, 227, 217	46	35	4. 71	4. 60	. 26	. 28
Santa Cruz	3, 586	3, 557	37	29	36. 02	27. 72	9. 40	6. 44
Yavapai	1, 544, 507	1, 595, 826	59	66	16. 31	15. 84	2. 11	2. 02
Yuma	1, 647	2, 504	21	24	29. 19	22. 21	9. 02	10. 69
	20, 927, 382	22, 382, 685	368	362	[1] 5. 40	5. 06	. 44	. 42

[1] Figures revised to exclude value of metal recovered from precipitates.

MINING INDUSTRY

The activity of the large smelting plants in Arizona in 1926, the revival of interest in mining in many of the old camps, and the large amount of construction work being carried on at many of the mills and smelters clearly indicated the progressive condition of the industry. Positive results were shown in the ore output for 1926, and the production of each of the metals—gold, silver, copper, lead, and zinc—exceeded the average of the last 10 years. Substantial improvements were made at both of the copper smelters at Douglas, especially since the concentrate from the New Cornelia mine at Ajo is being smelted at the Calumet & Arizona plant. Two features of unusual interest were the starting of the large new leaching plant of the Inspiration Copper Co. at Miami and the initial construction work on a large flotation mill for the United Verde Copper Co. at Clarkdale. The plans for a new custom mill and lead smelter for the Warren district lent additional interest to lead mining in the southeastern part of the State. Phoenix, Maricopa County, was put on the main line of the Southern Pacific Railroad, and renewed interest in mining was reported from the large producing districts as well as the small camps.

The output of ores of all kinds except siliceous silver ore showed a general increase. The output of copper ore exceeded that of all others and represented more than 98 per cent of the total ore. Lead ore and dry and siliceous ores followed. The total values of the metals recovered from the ores, old tailings, slag, etc., were as follows. Dry gold ore, $1,061,793; dry gold and silver ore, $97,906; dry silver ore, $226,836; copper ore, $108,141,151; lead ore, $2,343,818; zinc ore, $398,427; copper-lead ore, $310,507; and lead-zinc ore, $948,808. In addition, the placers produced gold and silver valued at $7,042. Thus, the State total was $113,536,288.

Ore, old tailings, etc., sold or treated in Arizona, 1917–1926, with content in terms of recovered metals

Year	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
			DRY AND SILICEOUS ORE			
1917	317, 716	131, 997. 57	848, 500	829, 737	309, 219	
1918	295, 548	149, 999. 60	917, 973	732, 519	16, 626	
1919	294, 675	135, 941. 83	1, 031, 185	731, 813	45. 642	
1920	280, 701	149, 518. 03	1, 051, 982	505, 153	46, 123	
1921	233, 201	116, 457. 77	580, 349	121, 903	56, 171	
1922	246, 286	108, 415. 11	1, 012, 558	291, 677	762, 602	
1923	566, 293	184, 458. 86	1, 968, 675	5, 567, 683	40, 870	
1924	239, 755	100, 630. 06	610, 213	1, 268, 955	30, 270	
1925	124, 990	36, 963. 83	505, 727	251, 411	1, 131, 863	
1926	139, 949	50, 685. 30	460, 826	327, 205	67, 669	
			COPPER ORE			
1917	15, 245, 297	98, 530. 97	[1] 5, 214, 411	[1] 710, 067. 644	60, 287	
1918	18, 647, 039	108, 750. 43	[1] 5, 347, 618	[1] 763, 766, 399	3, 465	
1919	13, 347, 182	78, 103. 32	[1] 3, 711, 052	[1] 537, 201, 237	179	
1920	14, 516, 580	76, 402. 41	[1] 3, 716, 246	[1] 557, 364, 143		
1921	5, 181, 177	21, 732. 17	[1] 1, 241, 436	[1] 184, 812, 780		
1922	10, 431, 729	57, 745. 04	[1] 2, 766, 277	[1] 399, 264, 191	2. 812	
1923	16, 331, 974	106, 691. 21	[1] 4, 269, 278	[1] 612, 303, 029	7, 282	
1924	19, 460, 836	128, 121. 07	[1] 5, 101, 837	[1] 675. 638, 828		
1925	20, 634, 428	[1] 153, 349. 54	[1] 5, 795, 173	[1] 711, 380, 756	151	
1926	22, 031, 292	167, 920. 23	[1] 5, 984, 415	[1] 720, 968, 835	244	
			LEAD ORE			
1917	82, 285	5, 739. 02	553, 544	726, 779	16, 289, 714	
1918	79, 811	3, 689. 47	362, 182	215, 746	11, 419, 226	
1919	76, 247	3, 701. 41	441, 739	137. 546	10, 088, 794	
1920	116, 269	5, 352. 21	521, 441	213, 346	13, 641, 815	
1921	40, 511	2, 947. 62	645, 563	89, 263	6, 435, 217	
1922	67, 138	3, 723. 28	744. 559	461, 980	14, 119, 456	
1923	115, 369	4. 514. 11	1, 090, 534	1, 035, 034	15, 991, 220	
1924	114, 670	6. 407. 26	912, 741	725, 567	18, 373, 553	
1925	127, 944	7, 807. 84	803, 153	877, 474	19, 580. 573	
1926	157, 854	10, 686. 05	716, 945	837, 443	19, 478, 777	
			COPPER-LEAD ORE			
1917	1, 610	54. 76	33, 647	141, 130	432, 484	
1918	916	34. 83	17, 578	90, 374	221, 259	
1919	7, 261	24. 09	82, 593	30. 248	68, 463	
1920	5, 108	35. 07	65. 619	173, 660	842, 037	
1921	141	10. 00	1, 956	10, 248	50, 045	
1922	435	16. 97	8, 357	25, 280	101, 673	
923	229	16. 74	15, 183	22, 856	101, 119	
924	5, 244	685. 50	24, 458	118, 663	238, 491	
925	24, 565	3, 264. 49	144, 567	833, 163	626, 720	
926	25, 020	2, 607. 66	145, 989	976, 026	360, 759	

[1] Includes metal recovered from precipitates.

Ore, old tailings, etc., sold or treated in Arizona, 1917–1926, with content in terms of recovered metals—Continued

ZINC ORE AND LEAD-ZINC ORE[2]

Year	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
1917 [2]	123, 285	8, 018. 78	333, 584	401, 601	6, 373, 741	20, 894, 860
1918	15, 172	240. 28	40, 768	50, 836	843, 113	2, 269, 643
1919	2, 038					1, 717, 000
1920	1, 820				69, 790	1, 457, 296
1921						
1922	457				84, 351	210, 624
1923	1, 313				151, 057	519, 103
1924						
1925	15, 455	148. 80	9, 224	12, 325	2, 536, 710	7, 332, 116
1926	28, 570	1, 772. 77	72, 796	186, 542	3, 350, 825	12, 946, 423

[2] Includes copper-zinc ore in 1917, as follows: 11, 375 tons, yielding 1,587.57 ounces of gold, 27,372 ounces of silver, 200,351 pounds of copper, 30,510 pounds of lead, and 799,894 pounds of zinc.

Ore, old tailings, etc., sold or treated in Arizona, 1925–26, with content in terms of recovered metals

1925

Source	Mines producing	Ore, old tailings, etc.		Gold		Silver	
		Short tons	Per cent	Fine ounces	Per cent	Fine ounces	Per cent
Dry gold ore	77	[1] 71, 289	0. 34	33, 644. 79	16. 68	60, 065	0. 83
Dry gold and silver ore	10	2, 036	. 01	432. 77	. 22	14, 630	. 20
Dry silver ore	38	[2] 51, 665	. 25	2, 886. 27	1. 43	431, 032	5. 94
Copper ore	88	[3] 20, 634, 428	98. 60	[4] 153, 349. 54	76. 01	[4] 5, 795, 173	79. 85
Lead ore	162	[5] 127, 944	. 61	7, 807. 84	3. 87	803, 153	11. 06
Zinc ore	3	305		1. 00		1, 389	. 02
Copper-lead ore	6	24, 565	. 12	3, 264. 49	1. 62	144, 567	1. 99
Lead-zinc ore	7	15, 150	. 07	147. 80	. 07	7, 835	. 11
Total, lode mines	[6] 368	20, 927, 382	100. 00	201, 534. 50	99. 90	7, 257, 844	100. 00
Total, placers	18			206. 42	. 10	24	
	386	20, 927, 382		201, 740. 92	100. 00	7, 257, 868	100. 00

Source	Copper		Lead		Zinc	
	Pounds	Per cent	Pounds	Per cent	Pounds	Per cent
Dry gold ore	149, 982	0. 02	4, 340	0. 02		
Dry gold and silver ore	28, 969	. 01	2, 799	. 01		
Dry silver ore	72, 460	. 01	1, 124, 724	4. 71		
Copper ore	[4] 711, 380, 756	99. 72	151			
Lead ore	877, 474	. 12	19, 580, 573	82. 01		
Zinc ore	7, 556		7, 359	. 03	240, 808	3. 28
Copper-lead ore	833, 163	. 12	626, 720	2. 63		
Lead-zinc ore	4, 769		2, 529, 351	10. 59	7, 091, 308	96. 72
	713, 355, 129	100. 00	23, 876, 017	100. 00	7, 332, 116	100. 00

[1] Includes 6,515 tons of old tailings sold to a smelter, 300 tons of old tailings concentrated, and 14,670 tons of old tailings cyanided.

[2] Includes 2,816 tons of old tailings sold to a smelter.

[3] Includes 5,957 tons of matte sold to a smelter, 61 tons of old smelter cleanings, and 1,039,512 tons of ore leached.

[4] Includes 0.14 ounce of gold, 40 ounces of silver, and 1,114,770 pounds of copper recovered from precipitates.

[5] Includes 796 tons of old tailings and 5,777 tons of old slag sold to a smelter and 9,515 tons of old tailings concentrated.

[6] A mine producing more than one class of ore is counted but once in arriving at total for all classes.

Ore, old tailings, etc., sold or treated in Arizona, 1925–26, with content in terms of recovered metals—Continued

1926

Source	Mines producing	Ore, old tailings, etc.		Gold		Silver	
		Short tons	Per cent	Fine ounces	Per cent	Fine ounces	Per cent
Dry gold ore	74	[7] 111,083	0.50	47,586.24	20.34	69,992	0.95
Dry gold and silver ore	7	9,440	.04	1,713.32	.73	92,574	1.25
Dry silver ore	46	[8] 19,426	.09	1,385.74	.59	298,240	4.04
Copper ore	106	[9] 22,031,292	98.43	167,920.23	71.76	[10] 5,984,411	81.08
Lead ore	157	[11] 157,854	.70	10,686.05	4.57	716,847	9.71
Zinc ore	7	6,533	.03	66.24	.03	33,932	.46
Copper-lead ore	7	25,020	.11	2,607.68	1.11	145,978	1.98
Lead-zinc ore	10	22,037	.10	1,706.53	.73	38,864	.53
Total, lode mines	[6] 302	22,382,685	100.00	233,677.01	99.86	7,380,971	100.00
Total, placers	21	....	....	333.96	.14	56	....
	323	22,382,685	....	234,010.97	100.00	7,381,027	100.00

Source	Copper		Lead		Zinc	
	Pounds	Per cent	Pounds	Per cent	Pounds	Per cent
Dry gold ore	231,657	0.03	24,892	0.11	....	....
Dry gold and silver ore	32,131	....	2,805	.01	....	....
Dry silver ore	63,417	.01	39,972	.17	....	....
Copper ore	[12] 720,968,845	99.68	244	....	....	....
Lead ore	837,443	.12	19,478,777	83.75	....	....
Zinc ore	129,808	.02	319,907	1.38	4,428,233	34.20
Copper-lead ore	976,026	.13	360,762	1.55	....	....
Lead-zinc ore	56,734	.01	3,030,918	13.03	8,518,190	65.80
	723,296,051	100.00	23,258,274	100.00	12,946,423	100.00

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[6] A mine producing more than one class of ore is counted but once in arriving at total for all classes.
[7] Includes 8,728 tons of old tailings sold to a smelter.
[8] Includes 1,500 tons of old tailings sold to a smelter.
[9] Includes 1,390,163 tons of ore leached and 811 tons of old smelter cleanings.
[10] Includes 58 ounces of silver recovered from precipitates.
[11] Includes 21,365 tons of old slag and 1,977 tons of old tailings sold to a smelter, and 24,423 tons of old tailings concentrated.
[12] Includes 2,350,343 pounds of copper recovered from precipitates.

Value of metals from ore, old tailings, etc., sold or treated in Arizona in 1926, by kinds of ore

Kind of ore	Ore, old tailings, etc. (short tons)	Gold	Silver	Copper	Lead	Zinc	Total
Dry gold ore	111,083	$983,695	$43,675	$32,432	$1,991	....	$1,061,793
Dry gold and silver ore	9,440	35,418	57,760	4,498	224	....	97,900
Dry silver ore	19,426	28,646	186,114	8,878	3,198	....	226,836
Copper ore	22,031,292	3,471,219	[1] 3,734,275	[1] 100,935,637	20	....	108,141,151
Lead ore	157,854	220,900	447,374	117,242	1,558,302	....	2,343,818
Zinc ore	6,533	1,369	21,174	18,175	25,593	$332,118	398,427
Copper-lead ore	25,020	53,905	91,097	136,644	28,861	....	310,507
Lead-zinc ore	22,037	35,277	24,251	7,943	242,473	638,864	948,808
	22,382,685	4,830,429	[1] 4,605,726	[1] 101,261,447	1,860,662	970,982	113,529,246
Total, 1925	21,927,382	[2] 4,166,088	[2] 5,056,944	[2] 101,296,428	2,077,213	537,241	113,133,914

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[1] Includes value of 58 ounces of silver and 2,350,343 pounds of copper recovered from precipitates.
[2] Includes value of 0.14 ounce of gold, 40 ounces of silver, and 1,114,770 pounds of copper recovered from precipitates.

GOLD ORE

Gold ore and old tailings, which represented one-half of 1 per cent of the total output of ore, old tailings, etc., were reported from 74 mines in 1926. This material yielded on the average $8.86 in gold and 0.63 ounce of silver to the ton, with a little copper and lead, and had a value of $9.56 in metals a ton. Mohave County, with 25 mines producing, reported the largest output of gold ore, followed by Yavapai County, with 27 mines, and Cochise County, with 2 mines. The largest producers of gold ore were the Katherine mine in the Union Pass district near Kingman, Mohave County, and the Tom Reed mine at Oatman.

GOLD AND SILVER ORE

Seven mines in five counties reported the production of gold and silver ore. This ore yielded on the average $3.75 in gold and 9.81 ounces of silver to the ton, with a little copper and lead, and had a value of $10.37 in metals a ton. Nearly all the gold and silver ore came from the Bunker Hill property at Tombstone, Cochise County.

SILVER ORE

A total of 46 mines in 10 counties reported the output of silver ore and old tailings. The largest quantities came from the Commonwealth mine near Pearce, Cochise County, and from the Reymert property near Superior, Pinal County. The silver ore and old tailings yielded on the average $1.47 in gold and 15.35 ounces of silver to the ton, with a little copper and lead, and was valued at $11.68 in metals a ton. The output of silver ore decreased appreciably as a result of the closing of the Signal mine in Mohave County.

COPPER ORE

Of the copper ore produced at 106 mines in Arizona,18,456,898 tons came from six low-grade disseminated deposits worked by five companies, whose mines are near Globe, Ray, Ajo, Bisbee, and Morenci. The crude copper ore mined and smelted directly (without concentration) amounted to 2,899,971 tons, and most of it was sulphide material. The total copper ore, etc., sold or treated in 1926 yielded on the average 16 cents in gold and 0.27 ounce of silver to the ton and 1.63 per cent of copper, and was valued at $4.89 in metals a ton, compared with $5.24 in 1925.

LEAD ORE

The output of lead ore, old tailings, and slag was reported from 137 mines in 11 counties; the average yield was $1.40 in gold and 4.54 ounces of silver to the ton, 6.17 per cent of lead, and a little copper, and was valued at $14.85 in metals a ton. Nearly 88 per cent of the total ore, old tailings, and slag came from 27 properties in Cochise County, and more than half of it was from mines near Bisbee, in the Warren district. Twenty-five mines in Pima County produced 6,456 tons of lead ore and old tailings, 11 mines in Gila County produced 3,285 tons of ore, 21 mines in Santa Cruz County produced 2,835 tons, 3 mines in Maricopa County produced 2,470 tons, and 10 mines in Pinal County produced 1,675 tons. The largest output of lead ore came from the property of the Shattuck Denn Mining Corporation near Bisbee, Cochise County.

ZINC ORE

Seven mines in Cochise, Mohave, and Yavapai Counties made the output of 6,533 tons of zinc ore, valued at $60.99 in metals a ton. Most of it came from the Copper King mine near Hillside, Yavapai County.

COPPER-LEAD ORE

Seven mines in five counties made the output of 25,020 tons of copper-lead ore, nearly all of which came from the Sheldon mine near Walker, Yavapai County. The total copper-lead ore yielded on the average $2.15 in gold and 5.83 ounces of silver to the ton, 1.95 per cent of copper, and 0.72 per cent of lead, and was valued at $12.41 in metals a ton.

LEAD-ZINC ORE

Lead-zinc ore (22,037 tons) was reported from 10 mines in Cochise, Graham, Mohave, and Yavapai Counties. This ore yielded on the average $43.06 in metals a ton. Nearly all the lead-zinc ore was mined from three properties—the Calumet & Arizona property at Bisbee, Cochise County; the Arizona Premier mine at Kingman, Mohave County; and the Aravaipa mine in Graham County.

Ore, old tailings, etc., sold or treated in Arizona, 1925–26, by counties, with content in terms of recovered metals

1925

DRY GOLD ORE

County	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Cochise	2,226	1,507.37	17,613	27,594	198	
Gila	18	18.14	7			
Maricopa	[1] 14,830	1,003.38	1,471	1,867		
Mohave	45,505	28,246.76	20,094	2,524	4,127	
Pima	352	242.94	1,082	1,459		
Pinal	212	142.08	61	301		
Yavapai	[2] 7,645	2,261.86	19,718	116,188	15	
Yuma	501	222.26	19	49		
	71,289	33,644.79	60,065	149,982	4,340	

DRY GOLD AND SILVER ORE

County	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
Cochise	184	44.50	1,174	1,001		
Graham	4	5.80	286			
Mohave	92	56.11	1,492	49	2,799	
Pima	14	4.76	209			
Yavapai	1,742	321.60	11,469	27,919		
	2,036	432.77	14,630	28,969	2,799	

DRY SILVER ORE

County	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
Cochise	[3] 23,055	2,638.61	245,593	46,560	9,039	
Gila	44	.10	2,431			
Greenlee	192	8.20	1,833	884	86	
Mohave	26,153	205.36	131,693	18,190	1,110,958	
Pima	17	.13	1,217	510	841	
Pinal	[4] 2,110	30.30	43,329	5,225		
Yavapai	29	2.92	796	1,091		
Yuma	65	.65	4,140		3,800	
	51,665	2,886.27	431,032	72,460	1,124,724	

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[1] Includes 14,650 tons of old tailings cyanided.

[2] Includes 6,515 tons of old tailings sold to a smelter, 300 tons of old tailings concentrated, and 20 tons of old tailings cyanided.

[3] Includes 2,655 tons of old tailings sold to a smelter.

[4] Includes 161 tons of old tailings sold to a smelter.

Ore, old tailings, etc., sold or treated in Arizona, 1925–26, by counties, with content in terms of recovered metals—Continued

1925—Continued

COPPER ORE

County	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Cochise	2, 436, 397	56, 354. 34	[5] 1, 369, 502	[5] 145, 596, 846		
Gila	[6] 8, 511, 388	8, 942. 33	622, 610	175, 608, 349		
Greenlee	[7] 1, 528, 217	[8] 3, 919. 29	[8] 139, 611	[8] 59, 463, 531		
Maricopa	15	. 80	8	2, 857		
Mohave	22	1. 01	26	4, 061		
Pima	[9] 3, 365, 031	14, 367. 02	254, 564	74, 762, 898		
Pinal	3, 283, 078	10, 439. 46	829, 449	102, 823, 025		
Santa Cruz	88	6. 70	1, 030	7, 479	151	
Yavapai	1, 509, 653	59, 153. 63	2, 577, 464	153, 045, 267		
Yuma	539	164. 96	909	66, 443		
	20, 634, 428	153, 349. 54	5, 795, 173	711, 380, 756	151	
LEAD ORE						
Cochise	[10] 117, 981	6, 897. 47	682, 156	796, 391	16, 346, 563	
Gila	580	29. 50	1, 713	3, 619	158, 019	
Graham	157		131	191	41, 740	
Greenlee	22		115	656	4, 721	
Maricopa	98	27. 00	478	1, 296	51, 000	
Mohave	1, 349	446. 42	26, 370	7, 681	342, 040	
Pima	2, 127	102. 84	15, 808	18. 149	893, 013	
Pinal	595	53. 38	2, 151	4, 797	262, 621	
Santa Cruz	[11] 3, 454	58. 81	45, 268	30, 187	1, 015, 397	
Yavapai	1, 039	175. 96	24, 656	13, 322	197, 992	
Yuma	542	16. 46	4, 307	1, 185	267. 467	
	127, 944	7, 807. 84	803, 153	877, 474	19, 580, 573	
COPPER-LEAD ORE						
Gila	12		1, 864	931	1, 393	
Pima	4	1. 30	66	370	3, 203	
Pinal	352	24. 50	15, 332	24, 974	311, 925	
Santa Cruz	14		174	891	2, 664	
Yavapai	24, 183	3, 238. 69	127, 131	805, 997	307, 535	
	24, 565	3, 264. 49	144, 567	833, 163	626, 720	
LEAD-ZINC ORE						
Cochise	13, 985				2, 349, 480	6, 712, 800
Gila	520				104, 160	189, 440
Mohave	615	147. 80	7. 712	4, 546	72, 332	174, 703
Santa Cruz	30		123	223	3, 379	14, 365
	15, 150	147. 80	7, 835	4, 769	2, 529. 351	7, 091, 308
1926						
DRY GOLD ORE						
Cochise	2, 904	5, 559. 60	12, 023	68, 458	20, 910	
Gila	252	31. 42	48	5, 278		
Maricopa	120	111. 36	45	1, 589	21	
Mohave	96, 059	38, 300. 40	40, 341	200	1, 929	
Pima	187	195. 81	846			
Pinal	83	46. 24	45	301		
Santa Cruz	13	2. 70	23	18	493	
Yavapai	[12] 9, 894	2, 435. 67	16, 558	155, 796	1, 539	
Yuma	1, 571	903. 04	63	17		
	111, 083	47, 586. 24	69, 992	231, 657	24, 892	

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[5] Includes 29 ounces of silver and 1,032,435 pounds of copper recovered from precipitates.
[6] Includes 344 tons of ore leached and 5,957 tons of matte sold to a smelter.
[7] Includes 61 tons of old smelter cleanings.
[8] Includes 0.14 ounce of gold, 11 ounces of silver, and 82,335 pounds of copper recovered from precipitates.
[9] Includes 1,039,168 tons of ore leached.
[10] Includes 5,777 tons of old slag sold to a smelter and 9,515 tons of old tailings concentrated.
[11] Includes 796 tons of old tailings sold to a smelter.
[12] Includes 8,728 tons of old tailings sold to a smelter.

Ore, old tailings, etc., sold or treated in Arizona, 1925–26, by counties, with content in terms of recovered metals—Continued

1926—Continued

DRY GOLD AND SILVER ORE

County	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Cochise	9,352	1,680.55	91,526	30,849	2,529	
Graham	2	8.00	355			
Mohave	45	13.86	299			
Pima	16	4.55	104	73	276	
Yavapai	25	6.36	290	1,209		
	9,440	1,713.32	92,574	32,131	2,805	

DRY SILVER ORE

County	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
Cochise	[13] 9,930	1,258.50	100,171	27,843	36,520	
Gila	232	.20	8,409	409	266	
Greenlee	404	18.71	4,966	418		
Maricopa	26	2.10	153	228	1,921	
Mohave	1,558	21.53	28,235	12,957	1,224	
Pima	13	13.67	1,310	527	41	
Pinal	[14] 6,759	45.85	144,776	20,353		
Santa Cruz	30		505	326		
Yavapai	224	22.54	5,920	356		
Yuma	250	2.64	3,815			
	19,426	1,385.74	298,260	63,417	39,972	

COPPER ORE

County	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
Cochise	2,431,357	57,915.80	[15] 1,528,377	[15] 140,551,283		
Coconino	26	.25	31	5,804		
Gila	[16] 9,846,911	10,173.12	566,886	177,776,310		
Greenlee	[17] 1,554,777	4,268.90	122,779	[15] 63,969,471		
Maricopa	11	1.27	286	1,713		
Mohave	114	39.01	15	17,604		
Pima	[18] 3,423,534	18,139.32	257,505	85,295,516	142	
Pinal	3,218,632	10,258.62	938,122	[15] 99,086,297		
Santa Cruz	649	14.11	407	87,805	102	
Yavapai	1,555,060	67,050.40	2,569,448	[15] 154,124,874		
Yuma	221	59.43	559	52,158		
	22,031,292	167,920.23	5,984,415	720,968,835	244	

LEAD ORE

County	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
Cochise	[19] 138,745	9,269.88	567,415	623,738	14,221,658	
Gila	3,285	91.40	30,104	3,542	187,512	
Graham	555	2.30	910	2,922	272,251	
Greenlee	1	.10	11	2	1,093	
Maricopa	2,470	546.95	4,905	20,628	264,309	
Mohave	752	431.24	5,286	1,004	218,589	
Pima	[20] 6,456	167.38	38,346	129,520	2,239,829	
Pinal	1,675	32.30	27,054	28,974	986,278	
Santa Cruz	2,835	47.04	33,085	24,810	713,208	
Yavapai	618	42.93	5,150	1,657	105,872	
Yuma	462	54.53	4,679	646	268,178	
	157,854	10,686.05	716,945	837,443	19,478,777	

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[13] Includes 1,190 tons of old tailings sold to a smelter.
[14] Includes 310 tons of old tailings sold to a smelter.
[15] Includes metal recovered from precipitates.
[16] Includes 256,340 tons of ore leached.
[17] Includes 811 tons of old smelter cleanings.
[18] Includes 1,073,823 tons of ore leached.
[19] Includes 675 tons of old tailings sold to a smelter, 24,423 tons of old tailings concentrated, and 21,365 tons of old slag sold to a smelter
[20] Includes 1,302 tons of old tailings sold to a smelter

Ore, old tailings, etc., sold or treated in Arizona, 1925–26, by counties, with content in terms of recovered metals—Continued

1926—Continued

ZINC ORE

County	Ore, old tailings, etc.	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Cochise	468					258, 180
Mohave	1, 084	43. 84	5, 393	3, 400	6, 480	220, 899
Yavapai	4, 981	22. 40	28, 539	126, 408	313, 427	3, 949, 154
	6, 533	66. 24	33, 932	129, 808	319, 907	4, 428, 233
COPPER-LEAD ORE						
Cochise	9		87	498	1, 445	
Pima	57	15. 48	2, 159	7, 363	16, 628	
Pinal	68	10. 30	1, 021	4, 944	40, 977	
Santa Cruz	30	. 95	518	6, 953	22, 808	
Yavapai	24, 856	2, 580. 93	142, 204	956, 268	278, 901	
	25, 020	2, 607. 66	145, 989	976, 026	360, 759	
LEAD-ZINC ORE						
Cochise	13, 017				2, 000, 000	5, 888, 890
Graham	2, 042				467, 320	1, 144, 338
Mohave	6, 810	1, 699. 98	36, 062	55, 229	531, 723	1, 448, 625
Yavapai	168	6. 55	2, 802	1, 505	31, 875	36, 337
	22, 037	1, 706. 53	38, 864	56, 734	3, 030, 918	8, 518, 190

The following table gives the kind and grade of zinc material marketed in 1925 and 1926:

Zinc ore, lead-zinc ore, and zinc and lead-zinc concentrates (as marketed from Arizona mines and mills) sold to smelters, 1925–26

Classification	County	Quantity (dry weight)	Gross zinc	Average assay of ore or concentrates	Recovered zinc
1925		*Short tons*	*Pounds*	*Per cent*	*Pounds*
Sulphide zinc ore	Cochise, Pima, and Yavapai	305	283, 300	46. 44	240, 808
Oxidized lead-zinc ore	Gila	520	236, 800	22. 77	189, 440
Sulphide lead-zinc ore	Cochise and Santa Cruz	14, 015	8, 407, 900	30. 00	6, 727, 165
Zinc concentrates	Mohave	177	209, 943	59. 31	174, 703
		15, 017	9, 137, 943	30. 43	7, 332, 116
1926					
Oxidized zinc ore	Cochise	468	331, 000	35. 36	258, 180
Sulphide zinc ore	Mohave and Yavapai	4, 990	4, 657, 158	46. 66	3, 954, 673
Sulphide lead-zinc ore	Cochise and Graham	15, 059	9, 016, 960	29. 94	7, 033, 228
Zinc concentrates	Mohave and Yavapai	2, 246	1, 991, 679	44. 34	1, 696, 815
Lead-zinc concentrates	Mohave	4	4, 054	50. 68	3, 527
		22, 767	16, 000, 851	35. 14	12, 946, 423

METALLURGIC INDUSTRY

In Arizona the general tendency toward concentration and smelting has been pronounced. About 80 per cent of the ore, old tailings, etc., shipped or treated in 1926 was ore concentrated and more than 13 per cent was first-class ore shipped for smelting; about 6 per cent was ore leached; and less than 1 per cent was ore treated by amalgamation or cyanidation and came chiefly from Mohave County.

Nine smelting plants within the State, all treating copper ores, were active throughout the year, and considerable ore from Arizona was treated at El Paso, Tex. Although the price of copper was not high and there was some curtailment, several of the large properties, such as the Inspiration, New Cornelia, Magma, Miami, Calumet & Arizona, and Morenci, decidedly increased their output. The smelter at Humboldt resumed operations in February, 1926, but was again closed early in 1927. A new lead stack was planned for the Warren district, Cochise County.

Fifty-five milling plants in Arizona were active in 1926. Thirty-one were concentration plants, of which 16 used tables and flotation devices, 7 used flotation alone, and 8 used jigs and tables without flotation cells. Five mills were equipped for amalgamation, 9 for cyanidation, 6 for amalgamation and concentration, 1 for amalgamation and cyanidation, and 3 for leaching. The New Cornelia leaching plant at Ajo operated regularly and treated more than 1,000,000 tons of carbonate ore by this method. At Inspiration a 7,500-ton leaching plant was completed and began operations late in November. Heap leaching was continued at Bisbee.

A list of the milling plants, with details of their equipment, in Arizona in 1925, prepared by the Bureau of Mines, may be had upon request.

Concentration reduced 17,926,570 tons of ore and old tailings to 1,074,169 tons of concentrates, and gold and silver mills produced 9 tons of concentrates.

Of the first-class material smelted copper ore constituted the largest part. The mines of the Verde district, Yavapai County, and those of the Warren district, Cochise County, together produced 90 per cent of the copper ore smelted. Lead ore was second in quantity and was followed by dry and siliceous ore and lead-zinc ore.

The miscellaneous material, other than ore and old tailings milled and crude ore smelted, consisted of 34,381 tons of old slag, smelter cleanings, and old tailings shipped for smelting, 1,330,163 tons of ore leached, and mine water precipitates. This material yielded 1,726.07 ounces of gold, 94,139 ounces of silver, 24,252,177 pounds of copper, and 1,722,870 pounds of lead, valued at $3,627,559. The copper came chiefly from ore leached and the gold and silver from old tailings and slag.

Mine production of metals at gold and silver mills in Arizona in 1926, by counties

County	Ore and old tailings treated		Recovered in bullion				
	Ore	Old tailings	Amalgamation		Cyanidation		Total value
			Gold	Silver	Gold	Silver	
	Short tons	*Short tons*	*Fine ounces*	*Fine ounces*	*Fine ounces*	*Fine ounces*	
Cochise	314	----------	----------	----------	100. 00	8, 310	$7, 252
Gila	7	----------	8. 39	4	----------	----------	176
Maricopa	75	----------	75. 73	24	----------	----------	1, 581
Mohave	[1] 95, 853	----------	22. 80	8	37, 634. 04	37, 373	801, 762
Pima	187	----------	195. 81	846	----------	----------	4, 576
Yavapai	[2] 439	----------	335. 60	84	29. 70	516	7, 925
Yuma	1, 820	----------	883. 04	60	2. 64	3, 815	20, 727
	[3] 98, 695	----------	1, 521. 37	1, 026	37, 766. 38	50, 014	843, 999
Total, 1925	[3] 46, 660	14, 670	840. 10	494	28, 511. 68	22, 378	622, 628

[1] Also yielded 1 ton of siliceous concentrate; metal yield included in following table.
[2] Also yielded 8 tons of copper concentrate; metal yield included in following table.
[3] Also yielded small quantity of concentrates, figures for which are included in following table.

Mine production of metals from Arizona concentrates in 1926

BY COUNTIES

	Ore and old tailings to concentrating mills		Concentrates and recovered metals						
	Ore	Old tailings	Concentrates produced	Gold	Silver	Copper	Lead	Zinc	Total value of metal
	Short tons	*Short tons*	*Short tons*	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*	
Cochise	1, 390, 009	24. 423	221, 753	10, 923. 38	356, 200	34, 770, 793	6, 114, 446	----------	$5, 805, 142
Gila	9, 472, 298	-------	305, 647	9, 470. 72	371, 648	165, 891, 512	36, 999	----------	23, 655, 457
Greenlee	1, 509, 068	-------	132, 483	3, 804. 43	97, 210	56, 578, 676	----------	----------	8, 060, 319
Maricopa	2, 325	-------	400	544. 65	4, 685	20, 600	207, 500	----------	33, 667
Mohave	8, 235	-------	[1] 3, 155	2, 100. 15	41, 725	58, 629	575, 472	1, 664, 005	248, 496
Pima	2, 325, 286	-------	104, 698	18, 114. 08	234, 207	64, 070, 190	2, 116	----------	9. 490, 592
Pinal	3, 164, 669	-------	297, 554	7, 809. 21	671, 433	88, 592, 761	----------	----------	12, 983, 391
Santa Cruz	1, 150	-------	281	16. 35	15, 353	11, 629	150, 044	----------	23, 549
Yavapai	28, 889	-------	[1] 8, 168	2, 718. 75	150, 070	1, 198, 295	345, 537	36, 337	347, 976
Yuma	218	-------	39	14. 10	599	4, 729	35, 736	----------	4, 186
	17, 902, 147	24, 423	[1] 1, 074, 178	55, 515. 82	1, 943, 130	411, 197, 814	7, 467, 850	1, 700, 342	60, 652, 775
Total, 1925	16, 811, 266	9, 815	[1] 1, 042, 190	45, 742. 50	1, 675, 967	397, 274, 298	5, 471, 262	174, 703	59, 010, 931

BY KINDS OF CONCENTRATES

	Concentrates produced	Gold	Silver	Copper	Lead	Zinc	Total value of metal
Dry and siliceous	430	521. 79	3, 454	9, 953	24, 080	----------	$16, 260
Copper	1, 059, 980	45, 353. 79	1, 569, 146	411, 011, 397	----------	----------	59, 458, 289
Lead	11, 518	9, 410. 15	360, 019	156, 341	7, 392, 869	----------	1, 032, 495
Zinc	2, 246	229. 91	10, 466	20, 037	49, 993	1, 696, 815	145, 349
Lead-zinc	4	. 18	45	86	908	3, 527	382

AVERAGE RECOVERABLE CONTENT

	Short tons	*Fine ounces per ton*	*Fine ounces per ton*	*Per cent*	*Per cent*	*Per cent*	*Value per ton*
Dry and siliceous	430	1. 21	8. 03	1. 16	2. 80	----------	$37. 81
Copper	1, 059, 980	. 04	1. 48	19. 39	----------	----------	56. 09
Lead	11, 518	. 82	31. 26	. 68	32. 09	----------	89. 64
Zinc	2, 246	. 10	4. 66	. 45	1. 11	37. 77	64. 71
Lead-zinc	4	. 05	11. 25	1. 08	11. 35	44. 09	95. 50
	1, 074, 178	. 05	1. 81	19. 14	. 35	. 08	56. 46
Total, 1925	1, 042, 190	. 04	1. 61	19. 06	. 26	. 01	56. 62

[1] Includes small quantity of concentrates from gold and silver mills.

Mine production of metals from Arizona crude ore shipped to smelters in 1926

BY COUNTIES

	Ore	Gold	Silver	Copper	Lead	Zinc	Total value of metal
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*	
Cochise	1, 167, 806	64, 543. 05	1, 868, 554	104, 658, 417	8, 596, 264	6, 147, 070	$18, 301, 110
Coconino	26	. 25	31	5, 804	------------	------------	836
Gila	122, 035	817. 03	233, 795	8, 677, 527	150, 779	------------	1, 389, 693
Graham	2, 599	10. 30	1, 265	2, 922	739, 571	1, 144, 338	146, 403
Greenlee	45, 303	467. 60	29, 700	7, 075, 351	1, 093	------------	1, 018, 836
Maricopa	227	41. 30	680	3, 558	58, 751	------------	6, 476
Mohave	2, 334	792. 87	36, 525	31, 765	184, 473	5, 519	58, 801
Pima	29, 665	207. 13	56, 292	3, 100, 272	2, 104, 282	------------	641, 789
Pinal	62, 238	2, 584. 10	435, 904	10, 460, 997	1, 027, 255	------------	1, 872, 142
Santa Cruz	2, 407	48. 45	19, 185	108, 283	586, 567	------------	75, 058
Yavapai	1, 557, 770	67, 510. 43	2, 606, 089	153, 673, 072	386, 077	3, 949, 154	24, 863, 066
Yuma	466	119. 86	4, 642	48, 092	232, 442	------------	30, 703
	2, 992. 876	137, 142. 37	5, 292, 662	287, 846, 060	14, 067, 554	11, 246, 081	48, 404, 913
Total, 1925	2, 983, 537	124, 816. 65	5, 501, 702	296, 365, 313	17, 896, 145	7, 157, 413	50, 583, 171

BY KINDS OF ORE

	Ore	Gold	Silver	Copper	Lead	Zinc	Total value of metal
Dry and siliceous	30, 798	9, 684. 81	386, 410	169, 887	39, 080	------------	$468, 233
Copper	2, 899, 971	123, 794. 62	4, 534, 670	286, 923, 832	244	------------	45, 558, 051
Lead	41, 426	3, 613. 47	339, 171	606, 175	11, 165, 625	------------	1, 264, 455
Zinc	5, 458	22. 74	28, 626	126, 408	313, 427	4, 212, 853	377, 067
Copper-lead	164	26. 73	3, 785	19, 758	81, 858	------------	12, 229
Lead-zinc	15, 059	------------	------------	------------	2, 467, 320	7, 033, 228	724, 878

AVERAGE RECOVERABLE CONTENT

	Ore	Gold	Silver	Copper	Lead	Zinc	Total value of metal
	Short tons	*Fine ozs. per ton*	*Fine ozs. per ton*	*Per cent*	*Per cent*	*Per cent*	*Value per ton*
Dry and siliceous	30, 798	0. 31	12. 55	0. 28	0. 06	------------	$15. 20
Copper:							
Oxidized	409, 638	. 04	1. 13	5. 07	------------	------------	15. 80
Sulphide	2, 490, 333	. 04	1. 63	4. 93	------------	------------	15. 70
Lead:							
Oxidized	32, 614	. 08	7. 93	. 82	11. 39	------------	27. 19
Sulphide	8, 812	. 10	9. 15	. 41	21. 20	------------	42. 82
Zinc:							
Oxidized	468	------------	------------	------------	------------	27. 58	41. 37
Sulphide	4, 990	. 01	5. 74	1. 27	3. 14	39. 63	71. 68
Copper-lead:							
Oxidized	11	. 09	12. 09	23. 01	70. 40	------------	186. 36
Sulphide	153	. 17	23. 87	4. 80	21. 69	------------	66. 53
Lead-zinc: Sulphide	15, 059	------------	------------	------------	8. 19	23. 35	48. 14
	2, 992, 876	. 05	1. 77	4. 81	. 24	. 19	16. 17
Total, 1925	2, 983, 537	. 042	1. 84	4. 97	. 30	. 12	16. 95

REVIEW BY COUNTIES AND DISTRICTS

COCHISE COUNTY

In Cochise County the mine production of all metals except gold was decidedly less in 1926 than in 1925, and the decreases in copper, lead, and zinc were larger than in any other county. The total value of the metals decreased $1,394,899. There were 50 mines producing, 3 less than in 1925. The value of gold increased from $1,394,177 to $1,564,647, but silver decreased from $1,607,673 to $1,434,951, copper from $20,798,512 to $19,782,374, lead from $1,627,534 to $1,302,645, and zinc from $512,650 to $461,030. The yield of each metal is given in the table on page 631. Ore of smelting grade (1,167,806 tons) yielded on the average $15.67 in metals a ton. Of the ore smelted

1,102,773 tons was classified as copper ore, of which 381,306 tons was estimated to be oxidized ore and 721,467 tons sulphide ore. The lead ore, old tailings, and slag (138,745 tons), as well as the lead concentrate, were shipped to plants outside the State and yielded 9,269.88 ounces of gold, 567,415 ounces of silver, 623,738 pounds of copper, and 14,221,658 pounds of lead. First-class lead ore amounted to 30,857 tons, all but 4,607 tons of which was oxidized. Copper ore of milling grade yielded 212,273 tons of copper concentrate, which was also shipped for smelting. Gold and silver bullion recovered from 314 tons of ore treated by cyanidation was valued at $7,252. The placer output amounted to $112 in gold and 1 ounce of silver.

Benson district.—More than 12,000 tons of slag was shipped from the dump of the old Salisbury smelter at Benson, which was active in 1884. This material, containing approximately 3 ounces of silver to the ton and 4 per cent of lead, was shipped to the lead plant at El Paso, Tex.

California district.—Seven lode mines in the California district produced 3,774 tons of ore and old tailings, yielding $95 in gold, 15,772 ounces of silver, 21,192 pounds of copper, and 1,319,484 pounds of lead, valued in all at $118,463, or $31.39 in metals a ton. The largest producer was the Hilltop mine, from which nearly 3,000 tons of lead ore was shipped to El Paso, Tex. A few cars of sulphide lead ore were also shipped from the adjoining property, the Hilltop Extension. About 675 tons of old mill tailing was shipped by lessees from the Ainsworth property by way of Rodeo, N. Mex., but the company did no mining. Other lots of lead ore were shipped from the Ananias and Manhattan properties.

Cochise and Golden Rule districts (Johnson, Dragoon).—Five lode mines in the Cochise and Golden Rule districts produced copper ore, lead ore, and a small lot of copper-lead ore; the total output of ore amounted to 478 tons and yielded $3,132 in gold, 1,017 ounces of silver, 28,569 pounds of copper, and 32,827 pounds of lead, valued in all at $10,393, or $21.74 in metals a ton. Several hundred tons of low-grade sulphide lead ore containing considerable gold was shipped from the Golden Rule property near Manzora, worked by the G. S. C. L. Leasing Co. Sulphide copper ore was shipped from the Mammoth and Republic property, formerly a large producer, now operated by the Mason Copper Co. Two cars of copper ore were also shipped from the Peabody property and one lot from the Keystone mine at Dragoon. The Keystone mill was idle, as the company was busy drilling for water.

Dos Cabezas and Teviston districts.—Three lode mines and one placer in the Dos Cabezas district produced 6,545 tons of ore, $9,586 in gold, 7,536 ounces of silver, 109,781 pounds of copper, and 123,517 pounds of lead, valued in all at $39,539. The ore had an average value of $6.02 in metals a ton. Nearly all the output was low-grade copper ore which was treated by concentration. The Le Roy Consolidated property was operated by the Arilead Mines Co., which shipped several cars of lead ore rich in both gold and silver, and also by the Miller Leasing Co., which shipped several cars of similar ore. The Central Copper Co. of Arizona (Inc.) operated its new 500-ton flotation plant for testing purposes a short time late in the year. Several cars of copper concentrate containing a little gold and silver were shipped to Douglas for smelting. The mill ore contains chalcopyrite, magnetite, and pyrite. No detailed report of operations was issued, but the company reported doing more than 8,000 feet of development work. In 1925 and 1926 large expenditures were made for the tramway from the mine to the mill, a new power plant, and the first section of the new flotation plant, which had its intitial run September 28, 1926.

Huachuca Mountain district.—A new 25-ton flotation plant, which is equipped with crusher, ball mill, classifier, and Simpson flotation cells, was under construction at the Huachuca Queen mine. A little development was also done, and one car of first-class lead ore was shipped for smelting. The Lead Bullion Mining Co. treated a little lead ore and shipped one car of lead concentrate from Hereford. The property of the Golden Fleece Mining Co. was under development during the entire year, but the 30-ton amalgamation-concentration mill was idle. The company reports 100,000 tons of copper ore in reserve.

Swisshelm district (Webb, Elfrida).—Three lode mines in the Swisshelm district produced 470 tons of ore, yielding $1,801 in gold, 9,446 ounces of silver, 767 pounds of copper, and 123,616 pounds of lead, valued in all at $17,691, or $37.64 in metals a ton. The output was chiefly oxidized lead ore shipped for smelting. The Four-Horse Mining Co. operated the Four-Horse and Apex groups and shipped several hundred tons of oxidized lead ore to El Paso, Tex. The mine is opened by several tunnels and about 400 feet of development work was done in 1926. The ore was hauled 13 miles to Webb, on the Southern Pacific Railroad. The Great American mine produced several cars of siliceous silver ore, and the Colford Copper Co. shipped one car of lead ore; the company then went out of business.

Tombstone district.—Twelve mines in the Tombstone district produced 47,708 tons of first-class ore, old tailings, and slag, which yielded $61,796 in gold, 220,579 ounces of silver, 113,476 pounds of copper, and 1,970,986 pounds of lead, valued in all at $373,003, or $7.82 in metals a ton. The output included 314 tons of siliceous silver ore from which bullion was recovered at a cyanidation plant. Ore of shipping grade, including some waste-dump ore, amounted to 12,260 tons, yielding on the average $3.78 in gold and 11.57 ounces of silver to the ton, 0.20 per cent of copper, and 1.46 per cent of lead. Material concentrated, principally old tailings, amounted to 25,923 tons, from which was recovered 2,060 tons of lead concentrate yielding on the average $5.45 in gold and 21.44 ounces of silver to the ton, 0.42 per cent of copper, and 26.80 per cent of lead.

The most important producer in the district was the property of the Bunker Hill Mines Co., comprising 27 claims worked by lessees. The output was chiefly gold and silver ore shipped to Douglas and several thousand tons of oxidized lead ore smelted at El Paso, Tex. Some lead ore was concentrated, and a little siliceous silver ore was treated by cyanidation. Production was somewhat less than in 1925 on account of the decline in the price of silver. The following paragraph is taken from the annual report of the Phelps Dodge Corporation:

> There were shipped from these operations at Tombstone in 1926, 12,380 tons, a decrease of 3,500 tons as compared with the tonnage of the previous year. The average metal content of the shipments showed a slight decrease in the silver and lead values and a compensating increase in the gold assay. Of the total tonnage 2,770 tons of silver-lead ore and concentrates went to the El

Paso smelter, 9,296 tons of silver ore were shipped to the Douglas smelter, and 314 tons were cyanided at Tombstone. Shipments were made from 49 separate leases operating on 27 claims. At the end of the year there were but 20 leases being worked.

Old tailings from the Grand Central dump near Fairbank, treated by flotation, contained an average of about 1 ounce of silver to the ton and 2 per cent of lead. These old tailings yielded most of the concentrate produced in the district and contained lead carbonate, which is sulphidized before floating. Work was suspended September 28 on account of the damage done to the railroad and dump by floods.

Several cars of silver ore were produced from the Hamilton, Old Guard, Portland, and Sunset properties, and several cars of old silver tailings containing lead were shipped from a dump near Fairbank. Several thousand tons of slag containing chiefly silver and lead was shipped from Charleston.

Turquoise district (*Courtland, Pearce, Gleeson*).—Eight lode mines in the Turquoise district produced 12,782 tons of first-class ore and 814 tons of old tailings, which yielded $25,133 in gold, 90,492 ounces of silver, 310,381 pounds of copper, 287,452 pounds of lead, and 258,180 pounds of zinc, valued in all at $167,412, or $12.31 in metals a ton. The most important producer in the district was the Commonwealth mine, from which nearly 7,000 tons of first-class siliceous silver ore and 814 tons of old tailings were shipped. Several hundred tons of siliceous silver ore and oxidized lead ore were shipped from the Tejon mine and oxidized lead ore and zinc ore from the Mystery mine. Lessees operating the Germania and Maid of Sunshine mines, owned by the Calumet & Arizona Mining Co., shipped several hundred tons of oxidized copper ore to the smelter at Douglas. One lot of oxidized zinc ore from the Great Western property was shipped east, and several hundred tons of copper ore was treated at Douglas. The Costello group, operated by the Mona Leasing Co., produced several hundred tons of copper ore and lead ore, the Silver Bill property considerable lead ore, and the Thelma mine at Courtland sulphide copper ore. At the Zinc Basin property, said to have 10,000 tons of $20 silver-lead-zinc ore in reserve, 300 feet of development work was done.

Warren district (*Bisbee, Lowell, Warren, Don Luis*).—Eight lode mines in the Warren district produced 2,520,503 tons of ore, yielding $1,463,034 in gold, 1,916,218 ounces of silver, 140,667,734 pounds of copper, 11,457,855 pounds of lead, and 5,888,890 pounds of zinc, valued in all at $23,710,532, or $9.41 in metals a ton. The output was almost equally divided between milling ore and first-class smelting ore. The largest producer of copper was the Copper Queen mine of the Phelps Dodge Corporation. Copper ore was treated in the smelting plant at Douglas, which is equipped with two reverberatory furnaces; and a large quantity of ore was milled in the 4,000-ton flotation plant, which treats chiefly the porphyry ore from Sacramento Hill. The property also produced a large quantity of oxidized lead ore, which was shipped to El Paso, Tex., and some copper was recovered locally by heap leaching. Mining is done by underground methods and by steam shovels, and more than 47,000 feet of development work was done in drifts, raises, and other workings. In November the company was planning the installation of a lead furnace at Douglas as well as a flotation plant for the lead ore. Altogether

1,322,342 tons of ore, chiefly from Sacramento Hill, averaging 1.61 per cent of copper, was milled with a ratio of concentration of 6.33 into 1. The total copper recovery was 86.93 per cent and the sulphide recovery was equivalent to 91.53 per cent. Experimental work continued throughout the year for the purpose of eliminating pyrite and raising the ratio of concentration. The work was successful, and equipment for fine grinding was ordered for all units of the mill. From Sacramento Hill 398,694 tons of ore averaging 0.74 per cent of copper went to the leaching dumps. From the beginning of leaching operations to the end of 1926 more than 39 per cent of the copper estimated as contained in the portion of the heap being irrigated had been extracted. The annual report of the company continues:

Ore and metals contained in output of Copper Queen mines in 1926

Kind of material	Total (dry weight)	Gold	Silver	Copper	Lead	Manganese
Underground limestone:	*Short tons*	*Ounces*	*Ounces*	*Pounds*	*Pounds*	*Pounds*
Copper ore	460, 896	27, 176	525, 833	50, 133, 054	----------	----------
Silver-lead ore	17, 792	935	113, 844	487, 415	3, 868, 259	----------
Manganese ore	2, 490	--------	--------	----------	----------	2, 004, 934
Underground porphyry: Milling ore	191, 405	931	21, 700	8, 670, 480	----------	----------
Sacramento Hill:						
Smelting ore	116, 078	1, 148	31, 894	14, 895, 074	----------	----------
Milling ore	1, 131, 534	5, 192	213, 993	33, 905, 613	----------	----------
Precipitates from leach heap	826	--------	28	1, 177, 399	----------	----------
Total	1, 921, 021	35, 382	907, 292	109, 269, 035	3, 868, 259	2, 004, 934

At the Copper Queen Branch the production of the limestones and porphyry mines was maintained on the same basis as in the past, but it is probable that the output of the underground section will decrease as the exploratory work for the past few years has not been successful in maintaining the ore reserves at a tonnage justifying the present rate of extraction. It has been decided to sink a deep shaft at Warren to develop the large acreage of geologically favorable limestones underlying that section of the district, near which was recently discovered a very rich ore occurrence by the Calumet & Arizona Mining Co. This shaft will be sunk about 2,000 feet before lateral prospecting will be started, so that it will require a couple of years before anything definite can be determined as to the productiveness of this unexplored region.

Experimental work with the object of increasing the ratio of concentration of the porphyry ores has met with some success at the Warren mill, but the problem of high-grade concentrates and satisfactory extraction has not yet been completely solved. The new reverberatory and roaster plant at the Douglas smelter was practically completed during the year and went into successful operation in January. Since then the plant has been running smoothly with the capacity as estimated. In view of recent developments in concentration and selective flotation of low-grade lead and zinc ores, it appears necessary and desirable to erect a mill at Warren and install a lead furnace at the smelter in order to beneficiate this class of material from the company's mines and such custom ores as may be offered.

The Calumet & Arizona Mining Co. was the largest producer of silver in the district and also produced important amounts of copper, gold, lead, and zinc. The output of the property was chiefly sulphide copper ore, but the company also shipped oxidized copper ore of smelting grade, a little sulphide lead ore, and considerable mixed lead-zinc sulphide ore. New deposits of rich copper ore were opened in both the Junction and Cole properties. The mines[2] produced 499,817 wet tons (485,303 dry tons) of ore from the Junction No.

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[2] Calumet & Arizona Mining Co. Ann. Rept. for 1926.

3 and Cole shafts on company account and by lessees. Of this ore 479,135 tons was treated at the company's smelter at Douglas. In addition 6,797 wet tons of low-grade copper sulphide ore, 253 tons of lead ore, 13,322 tons of lead-zinc ore, and 310 tons of manganese ore were shipped to other plants. The average grade of the ore shipped to the company's smelter was 4.87 per cent of copper, compared with 4.84 per cent in 1925.

During 1926 a total of 693,760 dry tons of ore and concentrate was smelted at Douglas, and the output of blister copper was 112,588,220 pounds, as compared with 103,949,220 pounds in 1925. This output is the greatest in the history of the smelter and was due to the smelting of a large quantity (99,362 tons) of New Cornelia (Ajo) concentrate, in addition to 52,217 tons of custom ore. The report continues:

> The principal discoveries of new ore were made on the High Card, Pay Day, and Regular claims near the Campbell shaft. This ore is a continuation of the ore bodies discovered last year. These ore bodies are of different sizes, good grade, and, so far as developed, are confined in an area approximately 450 by 500 feet on the 1,800 level and extending continuously, though of smaller area, to the 1,400 level. No development work has been done below the 1,800 level in this ore zone.

Dividends amounting to $3,856,542 were distributed to stockholders, making a total of $58,162,042 paid since the organization of the company in 1903. The net income for 1926 was $3,595,951, and the surplus December 31, 1926, was $10,489,854.

The Shattuck Denn Mining Corporation operated the Shattuck shaft and the lead concentration plant throughout the year and resumed operations in March at the Denn shaft. The company was a large producer of gold, silver, copper, and lead, and the procedure at the mill of concentrating carbonate lead-silver ore by flotation was perfected during 1926. The quantity of sodium sulphide and oils used in flotation thus was reduced and the use of xanthate discontinued. In consequence, the recovery of silver and lead was greatly improved. According to the report[3] for 1926, development in both the Shattuck and Denn shafts consisted of about 8,000 feet of drifting, raising, and sinking, as well as considerable diamond drilling. The company produced from both properties 90,550 tons of ore, from which 13,139.98 ounces of gold, 315,400 ounces of silver, 3,179,683 pounds of copper, and 5,798,362 pounds of lead were recovered. The Shattuck mine produced 64,246 dry tons of carbonate lead ore, of which 4,471 tons was smelted and 59,775 tons was milled. Other shipments of first-class smelting ore consisted of 10,556 tons of oxidized copper ore and 3,107 tons of siliceous gold ore. In addition to this output the Denn mine produced 12,641 tons of first-class sulphide copper ore. From the carbonate ore smelted 732,712 pounds of lead, 50,024 ounces of silver, 1,040.49 ounces of gold, and 79,260 pounds of copper were recovered. The lead concentrate yielded 5,065,650 pounds of lead, 206,163 ounces of silver, 5,504.95 ounces of gold, and 32,813 pounds of copper. The oxidized copper ore yielded 1,528,697 pounds of copper, 20,978 ounces of silver, and 428.99 ounces of gold. From the siliceous gold ores smelted 5,634.55 ounces of gold, 12,308 ounces of silver, and 22,092 pounds of copper were recovered. The sulphide copper ore—12,641 tons—from the Denn mine yielded 1,516,821 pounds of copper, 25,927 ounces of silver, and 531 ounces of gold. The average price received for lead recovered from first-class lead ore and from concentrates was 8.458 cents a pound, and the net operating cost was 6.67 cents. The average price received for copper was 13.92 cents a pound, and the net operating cost was 11.19 cents. The report of the corporation says:

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[3] Shattuck Denn Mining Corporation Ann. Rept. for 1926.

> In spite of the heavy expense necessary in connection with the reopening and reequipping of the Denn mine, the value of the ore taken out in the development work has approximately equaled all expenditures, and the working capital of the company has not been impaired. When operations at the Denn were resumed, the company was prepared to spend a large sum of money in developing the property, but such an expenditure has been unnecessary, and the mine has virtually paid its way during the first year of resumed operations. Having disposed of the expense of reopening and having discovered valuable ore deposits, it is expected that 1927 will give even better results.
>
> The Shattuck mine shows a moderate operating profit for the year, before depletion charges, and much credit is due the operating force at that property for the successful selective mining which they have carried out. The Shattuck mine is producing four classes of ore, which is shipped to three different smelters, after a part of it has been concentrated, and the greatest skill and watchfulness is necessary for the profitable conduct of these complicated operations. This profit was made during the year in spite of pronounced declines in the prices of copper, lead, and silver.

The gross income for 1926 was $1,153,500 and the net loss was $35,820. The surplus, however, was $4,283,966. A brief description [4] of the flow sheet of the Shattuck Denn mill was published in October.

The Night Hawk Leasing Co., which operates property (part of which is owned by the Phelps Dodge Corporation) south of the Copper Queen mine, shipped profitably a large quantity of sulphide copper ore containing gold and silver and did about 2,000 feet of development work. The company paid dividends amounting to $100,000 in 1926, or a total of $320,000 to date.

The Hancock-Dailey mine, 6 miles northwest of Bisbee, was unwatered and retimbered, and one car of gold-silver-lead ore was shipped to El Paso, Tex., and one to Douglas, Ariz. About 2,000 feet of development work was done at the Wolverine & Arizona property, which produced several thousand tons of oxidized copper ore. A small lot of sulphide lead ore was shipped from the dump of the Sure Thing property.

COCONINO COUNTY

Francis district.—A little work was done at the Emerald mine, and several small lots of oxidized copper ore were shipped from Anita on the Santa Fe Railway.

GILA COUNTY

Operators of 34 mines in Gila County reported 9,850,680 tons of ore sold or treated in 1926 compared with 8,512,562 tons of ore and matte in 1925. Gold increased from $185,841 to $212,840 and copper from 175,613,783 to 177,785,539 pounds, but silver decreased from 628,625 to 605,447 fine ounces and lead from 263,658 to 187,778 pounds. No zinc was produced in 1926. The county ranked first in the State in value of metal output, but this value decreased from $25,596,600 in 1925 to $25,495,636 in 1926, as a result of the decrease in the average price of copper. Copper ore was treated by concentration or leaching at Globe and Miami, but the lead ores and part of the copper ores were shipped to smelting plants outside the county. Of the copper ore smelted 111,797 tons was sulphide material and 9,251 tons oxidized ore. The 122,035 tons of smelting ore shipped had an average value of $11.39 a ton in recovered metals, and the 305,647 tons of concentrates, nearly all copper concentrate, had an average value of $77.39 a ton.

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[4] Stanley, I. H., "Flotation of lead carbonate": Mining Cong. Jour., October, 1926.

Banner district.—Six mines in the Banner district (Gila and Pinal Counties) made a total output of 44,513 tons of ore, which yielded $5,155 in gold, 11,851 ounces of silver, 2,350,128 pounds of copper, and 14,361 pounds of lead, valued at $342,716, or $7.70 in metals a ton. The largest part of this output was shipped from the Christmas mine of the Gila Copper Sulphide Co., 1 mile west of the Gila River. The mine was operated the entire year, and more than 44,000 tons of sulphide copper ore was shipped, which resulted in the output of more than 2,000,000 pounds of copper. The ore was mined from replacement deposits in limestone. After being in the hands of a receiver for more than a year the property was operated by the Christmas Copper Co. Several cars of copper ore were also shipped by the Banner Leasing Co., operating property near Christmas. One car of gold ore was shipped from the Columbia mine of the Dripping Springs Mines Consolidated, and one car of lead ore from the C. & B. claims where lead vanadate occurs.

Globe district (*Miami, Inspiration*).—Twenty mines in the Globe district made a total output of 9,802,958 tons of ore, which yielded $205,784 in gold, 558,165 ounces of silver, 175,385,817 pounds of copper, and 142,146 pounds of lead, valued in all at $25,119,465, or $2.56 in metals a ton. Most of the ore (9,469,523 tons) was concentrated and yielded 305,511 tons of concentrates, which, with 77,095 tons of crude ore, were shipped for smelting. Virtually all of the concentrate and first-class ore went to a smelting plant in the district, but all the lead ore, with part of the copper ore, was shipped to El Paso, Tex. The largest output was from the Inspiration mine, which yielded 5,493,277 tons of copper ore. The next largest producer was the Miami Copper Co., with 3,793,207 tons. Considerable copper ore was also produced by the Old Dominion, Iron Cap, Arizona Commercial, and Superior & Boston mines. Several cars of lead ore were shipped to El Paso, Tex., from the Crow, New Dominion, Dickinson, and Sampson mines, and small lots of copper ore were shipped from the Kearsarge & Monadnock, Millcreek, and Portland properties. One small lot of siliceous silver ore was shipped from the Silver Lake mine. From the Inspiration property[5] a total of 81,696,084 pounds of copper was produced during 1926, consisting of 78,696,391 pounds from concentrating operations, 2,652,586 pounds from leaching, and 347,107 pounds from direct smelting. The ore mined and treated averaged 1.02 per cent of copper. The copper produced in 1926 was recovered from the treatment of 5,493,277 tons of ore, including 3,558,921 tons of Inspiration concentrating ore, 1,650,898 tons of Live Oak concentrating ore, 9,843 tons of Keystone concentrating ore, 10,661 tons of Inspiration ore of smelting grade,

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[5] Inspiration Consolidated Copper Co. Ann. Rept. for 1926.

4,665 tons of Live Oak ore of smelting grade, 1,797 tons of Keystone ore of smelting grade, and 256,492 tons of leaching ore.

The average copper content of ore from the Inspiration section was 0.949 per cent, Live Oak 1.173 per cent, and Keystone 1.105 per cent. Leaching ores from the Inspiration section averaged 1.260 per cent of copper, Live Oak 0.870 per cent, and Keystone 0.816 per cent. The smelter assay of the total concentrates produced was 33.985 per cent of copper, flotation concentrate averaged 35.92 per cent, and table concentrate 5.57 per cent. The ratio of concentration was 45.7 into 1. The recovery of copper in concentrate, calculated from assays and weights of ore and tailing, was 75.08 per cent, and the recovery of copper sulphides was 92.91 per cent. The cost of fine copper produced, including depreciation, but excluding depletion and Federal taxes, amounted to 12.444 cents a pound. Dividends paid to stockholders in 1926 amounted to $2,363,934. The property has about 90,000,000 tons of ore in reserve and 164,937 feet of development work was done during the year, giving a total of 129 miles of workings in the property. The mine and the 18,000-ton concentration-flotation plant were operated the entire year, and the new leaching plant, which has a daily capacity of 7,500 tons, commenced operations late in November. The net income for the year ended December 31, 1926, was $1,310,896, and the surplus was $6,686,879. The report continues:

> With the completion of the metallurgical plant for the treatment of mixed ores the productive annual capacity of the property is approximately 120,000,000 pounds of fine copper. By reason of the conditions existing in the copper market it has been deemed advisable not to increase the production of copper over the rate of production for the year 1926 until such conditions are corrected. * * *
>
> At the end of the year there were only a few minor items of construction to complete at the new leaching plant. Crushing operations commenced, and the first ore was charged to the leaching tanks on September 26. The crushing and ore-handling equipment have worked satisfactorily and are of ample capacity.
>
> It was necessary at the beginning to mine and treat ore having the greatest proportion of its copper content in oxidized form, so that the leaching solutions would build up in ferric sulphate (the solvent used for copper sulphides) before mixed ores having higher copper sulphide content were charged.
>
> A total of 501,455 tons of ore were crushed and charged to the leaching tanks. The average copper content was 0.91 per cent total copper, with 0.72 per cent as copper in oxide form.

The general conditions at the property and the features of the new leaching plant were discussed in a short article[6] published in November.

According to the annual printed report of the Miami Copper Co. 55,289,174 pounds of refined copper was produced from 3,793,207 tons of milling ore at a cost of 10.624 cents a pound. The concentration-flotation plant was operated at full capacity for 360 days; it treated an average of 10,537 tons of ore a day, containing on the average 0.979 per cent of copper, from which 4,607,431 pounds of copper was produced a month. The property has in reserve 84,586,743 tons of sulphide ore averaging 0.93 per cent of copper and 7,000,000 tons of mixed ore averaging 1.83 per cent of copper. More than 38,000 feet of development work was done in 1926 in drifts and raises. From 3,793,207 tons of ore milled 101,921 tons of concentrate was produced, averaging 27.962 per cent of copper, or a recovery of 76.77

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[6] Cooper, Cecil M., "Globe-Miami: Leading copper producer in Arizona": Eng. and Min. Jour., Nov. 26, 1926, vol. 122, p. 852.

per cent. Dividends amounting to $840,505 were paid to stockholders in 1926, making a total of $30,701,969 paid since May 15, 1912. The report says:

> The entire six sections of the mill were operated at full capacity during the year. * * *
>
> The entire tonnage stoped was mined by the system of undercut caving with controlled ore drawing which was inaugurated last year and which to date has proven entirely successful both as to costs and extraction of clean ore. Up to date six stopes, estimated to contain approximately 1,000,000 tons each, have been put on production * * *
>
> Improvements in the crushing plant during the year made it possible to deliver a finer feed to the concentrator, which resulted in increasing the average daily tonnage milled from 9,950 tons in January to 11,398 in December, and during this same period added capacity to the concentrate retreatment plant made it possible to increase the grade of the concentrate produced from 23.514 per cent in January to 33.423 per cent in December. * * *
>
> The cost of producing refined copper up to concentrate on board cars at Miami was as follows:

	Per ton ore, 14.576 pounds copper	Per pound copper
Mining	$0.37092	$0.02545
Milling	.49052	.03365
General	.14857	.01019
Total	1.01001	.06929

> During the year there was added to the sulphide ore reserves 20,462,436 tons, averaging 0.689 per cent total copper, with 0.050 per cent soluble copper.

According to the annual report of the Old Dominion Co. for 1926 a total of 362,209 dry tons of ore was mined, of which 9,978 tons was smelting ore averaging 8.2 per cent of copper, and 352,231 tons was concentrating ore averaging 3.82 per cent. The total metals produced from ore, concentrate, and precipitates were 25,425,833 pounds of copper, 149,235 ounces of silver, and 7,040 ounces of gold. Approximately 985,000 tons of ore averaging 3.7 per cent of copper was said to be in reserve, and 30,359 feet of development work was done in drifts and raises. The 1,400-ton mill, equipped for concentration and flotation, was active the entire year, treating custom ore as well as Old Dominion milling ore. All the smelting ore and concentrate was shipped to Inspiration for smelting. The copper minerals are chiefly chalcopyrite, bornite, and chalcocite, but some carbonate minerals also occur. Dividends amounting to $14,405,260 were paid to stockholders from December 15, 1905, to December 31, 1918, but none in 1926. The report continues:

> The tonnage of ore mined during the year exceeded that of the previous year, but owing to the decrease in the tons of direct smelting ore mined and a slight decrease in the grade of both smelting and concentrating ore, the refined copper produced fell from 27,283,655 pounds to 25,425,833 pounds in 1926. The constantly improving metallurgical methods enable the company to handle a much lower grade of ore than formerly with financial results as good or better than that had with a much higher grade of ore in previous years.
>
> The larger part of the concentrating ore came from the east part of the mine on the sixteenth, eighteenth, and twentieth levels. From the west part of the mine small quantities came from the Maggie vein on the twentieth level, from stopes on the eighteenth and twentieth levels, and from development work on the twenty-second level.

> Considerable repairs were made in the shafts. Concrete work was done in several places, the "A" shaft being concreted on all four walls for 161 feet and 40 feet on one wall. * * *
>
> Results at the concentrator were quite satisfactory. * * * The ratio of concentration increased from 4.62 to 5.23 to 1. Construction of the new unit at the concentrator was completed during the year with the exception of some minor details, and the construction of the new unit to the crushing plant is well under way and is expected to be in operation soon.

According to the annual report of the Arizona Commercial Co. 87 per cent of the ore output was sent to the Old Dominion concentrator at Globe and the balance to the International smelter at Miami for converter lining. The total output was 65,689 tons of ore—57,241 tons of milling ore averaging 5.2 per cent of copper, and 8,448 tons of siliceous ore averaging 4.92 per cent. The total production was 5,985,607 pounds of refined copper, 34,614 ounces of silver, and 1,444 ounces of gold. The sales of refined copper amounted to 5,938,339 pounds, which sold for 13.87 cents a pound. Expenditures for mining, treatment, and refining were $639,758; selling, general, and administration $38,775; and depreciation $61,477. The total dividends paid since October 31, 1916, including $265,000 paid in 1926, amounted to $2,014,000. The income for 1926, before depletion, was $149,087, and the surplus at the end of the year was $1,280,395. The property was operated the entire year, during which 3,484 feet of drifting and raising was done. The mine is said to have 150,000 tons of ore containing on the average 4.2 per cent of copper, chiefly in the form of bornite and chalcopyrite. The report says:

> Development work is being carried on at No. 1 and the Eureka shafts. The work done at the Eureka shaft has not as yet encountered ore. * * *
>
> The work done during the year on the lower levels near No. 1 shaft has confirmed the view that commercial ore bodies can not be expected to be found in the igneous diabase which directly underlies the sediments throughout the property. However, it is expected that in the schist formation underlying the diabase ore bodies will be encountered.

The Iron Cap Copper Co. was a large producer of copper ore which contains more than the average quantity of silver for ore from the Globe district. The mill, which has a daily capacity of 350 tons, was in operation only eight months. The ore reserves were said to be nearly exhausted, although 900 feet of development work was done during the year. From 67,215 tons of ore mined 46,690 tons was milled, producing 5,258 tons of concentrate. The concentrate contained 2,259,618 pounds of copper, 32,901 ounces of silver, and 191 ounces of gold. The smelting ore (20,525 tons) contained 1,903,420 pounds of copper, 82,211 ounces of silver, and 142 ounces of gold. The cost of milling 1 dry ton of ore treated in the 350-ton concentration-flotation plant was $1.66. The current tailing from this plant amounted to 41,432 dry tons and contained 0.22 per cent of copper and 0.163 ounce of silver to the ton. The copper sold for $538,210, silver $65,118, and gold $5,509; the company received from other income $36,414, or a total of $645,251. Transportation, smelting, refining, marketing, mining, and milling charges amounted to $491,053, which, with taxes, interest, discount on bonds, and administrative and litigation expenses, totaled $571,279. Deduction of this amount from the total income left a profit of $73,972 before depreciation and depletion charges for the current year, amounting to $53,378, were calculated. The total gain for the year was $20,594. The total dividends paid since November, 1917, including $6,981 paid in 1926, have amounted to $1,060,189. As the known ore reserves of the Iron Cap mine are practically exhausted, the company has acquired an interest in the Christmas Copper Co., at Christmas, through part ownership of the Mineral Products Co.

The Superior & Boston Copper Co. shipped nearly 9,000 tons of silver-bearing copper ore, mostly oxidized material, including malachite and chrysocolla. Early in 1927 shipments ceased on account of the low market prices for silver and copper, and the mine was closed indefinitely, although 3,700 feet of development work was done in 1926. According to the printed report of the company, during the fiscal year ended September 30, 1926, the mine produced 10,459 dry tons of ore averaging 4.68 per cent of copper and 12.23 ounces of silver to the ton. This ore contained 979,083 pounds of copper and 127,906 ounces of silver, for which the company received $121,671 after freight and smelting charges were deducted, or an average of $11.63 a ton. Of the total output 63 per cent was produced from the North and Dewey veins and 37 per cent from the Footwall vein. The report says:

> During the last quarter some of the highest grade ore ever found in the Superior and Boston mine has been opened up in the Footwall vein. As the company owns the western extension of this vein for several thousand feet, it seems that this is the most promising field for development work on the upper levels; that is, above water level. * * *
>
> When opportunity offers, further work on the eastern extension of the North vein on both the 600 and 800 levels is fully justified.
>
> At the beginning of the fiscal year sinking of the McGaw shaft was in progress. This was completed to below the 1,800-foot level, and the cutting of a station on that level to permit exploration for the Old Dominion vein was begun.

At the property of the Pinto Valley Co. about 2,000 feet of churn drilling and 400 feet of tunneling was done during the year. Work has been confined to experiments in leaching crushed sulphide ore in bins on the surface with ferric sulphate and sulphuric acid solvents.

Green Valley district.—The output of the Green Valley district consisted of one test lot of copper ore from the Tonto property and a little gold ore from the Gold Bond and Columbia claims treated by amalgamation. Nearly $3,500 was expended in developing the Tonto property.

Pioneer district.—The most productive part of the Pioneer district is in Pinal County, but part of it extends into Gila County. The Pioneer group of the White Metal Mining Co. produced lead ore, which was treated in a 50-ton concentration plant, and several hundred tons of first-class siliceous silver ore. The Western Syndicate (Inc.) and the Bobtail Development Co. each shipped a car of copper ore. The total production of the district is given under Pinal County.

Summit district.—Lessees shipped several cars of sulphide copper ore from the Gibson mine west of Miami.

Young (Spring Creek) district.—A little lead ore containing considerable gold and silver was milled at the Spring Creek property, 10 miles west of Young.

GRAHAM COUNTY

Three lode mines in Graham County produced 2,599 tons of ore yielding metals valued at $146,403, most of which was for zinc. The output represents an increase of $142,336 over that of 1925.

Aravaipa district.—The Aravaipa Mining Corporation shipped from Cork on the Southern Pacific Railroad much lead-zinc ore to an eastern smelter and several hundred tons of lead ore to El Paso, Tex. The property is opened by two shafts, 600 and 300 feet deep, and considerable development was done during the year as well as work on the 100-ton flotation mill. The oxidized ore will be ground in a ball mill, sulphidized, and treated by flotation. The company reports a large quantity of ore in reserve containing about 14 per cent of lead and 18 per cent of zinc.

Rattlesnake district.—A small lot of rich gold-silver ore was shipped from the Long Tom No. 2 claim. The post office of the mine is Klondyke, but the ore is hauled several miles to Willcox on the Southern Pacific Railroad.

GREENLEE COUNTY

The total value of the metal output in Greenlee County increased from $8,623,756 in 1925 to $9,124,408 in 1926. The output is chiefly copper ore from the Morenci property of the Phelps Dodge Corporation. The output of copper increased more than 4,500,000 pounds, and there was also a small increase in the output of gold but a decrease in silver.

Ash Peak district.—Lessees shipped several cars of siliceous silver ore from the Ash Peak mine and similar ore from the Ash Peak Extension property.

Copper Mountain and Greenlee districts (Morenci, Metcalf, Clifton).—The output of the Copper Mountain and Greenlee districts was chiefly copper ore from the Morenci property of the Phelps Dodge Corporation. The company operated the 4,500-ton mill equipped for gravity concentration and flotation, as well as the smelting plant, which has two reverberatory furnaces. The company has in reserve a large quantity of ore that contains about 2 per cent of copper, occurring as chalcocite in porphyry and in veins. Approximately 69,529 feet of development work was done during the year. The smelter at Clifton treated a total of 178,300 tons of concentrates and crude ore, including 129,990 dry tons of concentrate from 1,509,068 tons of ore treated at the Morenci mill, and produced 64,740,600 pounds of copper. The report says:

> The Morenci Branch operated throughout the year at full mill capacity. With depth, however, the ore is becoming harder, and it has become increasingly difficult recently to maintain the tonnage for which the mill was originally designed. Additional crushing and grinding machinery will be added during the current year in order to maintain a capacity of 5,000 tons per day. Developments underground in the extension of previous known ore bodies have been very satisfactory and the reserves fully maintained.

One car of copper ore of good grade was shipped to El Paso, Tex., by the Dover Mining Co., which did about 1,200 feet of drifting and 200 feet of raising. The property is 10 miles from Clifton.

San Francisco River district.—A little placer gold was recovered by drifting in ancient river beds 6 miles south of Clifton.

MARICOPA COUNTY

Fourteen mines in Maricopa County produced 2,627 tons of ore. Of this output 2,325 tons was concentrated and yielded 400 tons of concentrate containing gold, silver, copper, and lead. The first-class smelting ore amounted to 227 tons and yielded metals valued at $6,476. Gold and silver bullion valued at $1,581 was recovered from 75 tons of ore treated in amalgamation plants. In addition to this output, two placer operators produced $680 in gold and 6 ounces of silver. Altogether the output of the county was $14,358 in gold, 5,395 ounces of silver, 24,158 pounds of copper, and 266,251 pounds of lead, valued at $42,407, an increase of $14,316 over 1925.

Big Horn district.—One car of gold ore was shipped from the Alaskan mine, that has much ore in reserve opened by a 125-foot inclined shaft.

Sunset district.—A small test lot of gold ore was shipped from the Sunset claim.

Vulture district.—One placer and 11 lode mines in the Vulture district produced 2,588 tons of ore, $13,412 in gold, 5,107 ounces of silver, 22,488 pounds of copper, and 266,251 pounds of lead, valued in all at $41,047. The ore had a value of $15.80 in metals a ton. Activity in the district resulted in the shipment of several small lots of ore from various properties, but most of the output was that of the Belmont-MacNeill and Moon Anchor properties, both operated by the Tonopah Belmont Development Co., of Tonopah, Nev. About 1,500 feet of development work was done at the MacNeill property, and a new 50-ton flotation mill built and operated part of two months. The mill treated 2,326 tons of ore yielding 414 tons of concentrates, which contained 639.97 ounces of gold, 5,870 ounces of silver, 246,178 pounds of lead, and 32,569 pounds of copper. The ratio of concentration was 5.61 to 1, and the mill recoveries were 69.88 per cent of the gold, 78.52 per cent of the silver, 82.55 per cent of the lead, and 68.07 per cent of the copper. Work was handicapped by lack of water, but when a regular supply is established better results are expected of the mill, as the company estimates that it has 23,879 tons of $30 ore in reserve. The product is hauled 28 miles southwest to Dixie, on the Southern Pacific Railroad, and shipped to El Paso, Tex. The minerals contained in the ore are galena, chalcopyrite, sphalerite, and covellite. Several cars of first-class lead ore were shipped from the Moon Anchor or Osborn property. A small test lot of copper ore was shipped from the West Vulture property, and several tons of gold ore from the Garcia and Metropolitan mines was treated by amalgamation.

MOHAVE COUNTY

In Mohave County 60 mines produced 106,422 tons of ore, an increase of 32,686 tons over 1925. The gold increased from $601,622 to $838,429, due to the large output of gold ore from the Katherine mine, copper from 37,051 to 90,394 pounds, and zinc from 174,703 to 1,669,524 pounds. This large increase in zinc was the result of increased shipments of lead-zinc ore from the property of the Arizona Premier Mines Co., 12 miles north of Kingman. Silver decreased from 187,387 to 115,632 fine ounces and lead from 1,532,256 to 759,945 pounds, but the total value of metals increased from $883,513 to $1,109,248. The placer output, included above, was valued at $190. The ore treated by amalgamation or cyanidation, mainly the latter, amounted to 95,853 tons, which yielded $778,436 in gold and 37,381 ounces of silver, having a total value of $801,762, or an average of $8.36 a ton. The concentrating ores (8,235 tons) yielded

3,154 tons of concentrates which, with 1 ton of concentrates from gold and silver mills, had a total value in metals of $248,496, or an average of $78.76 to a ton of concentrates. Crude ore shipped to smelters amounted to 2,334 tons and had a total value in metals of $58,801, or an average of $25.19 a ton. The most important producer in the county was the Katherine mine in the Union Pass district, followed by the Tom Reed mine at Oatman. The Western Ore Purchasing Co. operated its sampler at Kingman and continued to purchase ore from mines in the vicinity. Many small mines that would otherwise have remained idle were thus able to market their product.

Aubrey district.—A little gold ore and a test lot of zinc ore were shipped from shallow workings at the Boulder and Black Jack claims. The ore is hauled 65 miles to the sampler at Kingman.

Cedar Valley district.—Small lots of lead ore were shipped from the San Francisco and W. P. Carr properties near Yucca.

Chemehuevis district.—Rich gold ore in small lots was shipped to the Kingman sampler from the Padilla and Gold Dollar claims, and similar material from the Dutch Flat property was treated by amalgamation and concentration in a 10-ton Gibson mill. A little fine placer gold was also produced from a property near Yucca.

Gold Basin district.—The 40-ton cyanidation mill at the Gold Basin property 35 miles north of Chloride in the Cerbat Range was remodeled and its capacity increased to 75 tons a day. Development has opened a new body said to average $6 to $10 a ton in gold.

Hackberry district.—A small test lot of copper ore was shipped from the Three Old Men claim.

Indian Secret district.—A small test lot of silver ore was shipped by the White Hills Silver Mines (Inc.).

Maynard district.—The Kaaba Mining & Milling Co. operated a small pilot mill on ore that contains vanadate of lead and shipped lead concentrate rich in gold. The company has developed a large quantity of ore said to contain on the average 1 ounce of gold to the ton, 1 per cent of vanadium, and 6 per cent of lead. A 125-ton flotation plant was under construction.

Music Mountain district.—The Roosevelt property near Hackberry produced a little gold ore, which was treated in an arrastre. Development was continued at the Portland & Mizpah group, where more than 500 feet of drifting and crosscutting was done. The property is reported to have 12,000 tons of $20 ore in reserve.

Owens (McCracken and Potts Mountain) district.—Six lode mines in the Owens district produced 107 tons of ore, yielding $847 in gold, 611 ounces of silver, 9,207 pounds of copper, and 18,374 pounds of lead, valued in all at $3,987, or $37.26 in metals a ton. Several lots of copper ore containing considerable gold were shipped from the Red Top group near Signal, and small lots of lead ore were sent to the Kingman sampler or to Midvale, Utah, from the Black Hawk, Lead Pill, and Silver Triangle properties. The Signal Mines Co. was formerly a large shipper of lead ore.

San Francisco district (Oatman, Gold Road, Vivian).—Twelve lode mines in the San Francisco district produced 29,721 tons of ore, yielding $395,971 in gold and 9,964 ounces of silver, valued together at $402,188, or $13.53 a ton. Nearly all this output was gold ore treated by cyanidation, most of which came from the Tom Reed mine, operated by lessees. The property was sixth in the production of gold in Arizona in 1926; approximately 1,000 feet of development work was accomplished. The 275-ton cyanidation plant was run by lessees on mine ore and custom ore, bullion being sent chiefly to the mint at San Francisco, Calif. Receipts from bullion sold amounted to $354,743, and dividends of $72,800 were paid. Several hundred tons of gold ore mined by lessees at the Big Jim property of the United Eastern Mining Co. was treated at the Tom Reed plant, and a little ore from the Gold Road mine, formerly a large producer, was also treated at this custom plant. At the Oatman United mine 1,200 feet of development work was done, and a new 75-ton cyanidation plant ran from January to April, after which it was closed on account of the low grade of the ore. Bullion and precipitates were recovered by the Gold Dust Mines Co., which ran a new 50-ton cyanidation plant a short time. At the Sheep Trail property lessees worked over the old ore dumps and treated gold ore in a 15-ton mill equipped for amalgamation and cyanidation. A small lot of rich gold ore from the Telluride mine was milled at the Tom Reed plant, but the largest part of the output was exceptionally rich gold ore shipped through the Kingman sampler for smelting. A small test lot of rich gold ore was also shipped from the Arabian claim. A large deposit of gold ore was opened on the 700-foot level of the United Western property now owned and worked by the Western Apex Mining Co.

Union Pass district.—The Katherine mine northwest of Kingman has suddenly become prominent by producing more gold from siliceous gold ore than any other property in Arizona. The 250-ton cyanidation plant, the capacity of which has gradually been increased, was operated the entire year, and 12,000 feet of development work was done in drifts, crosscuts, and raises. The main shaft is being sunk from the 400 to the 950 foot level. A large quantity of ore averaging about $8 in gold to the ton was said to be in reserve. Gold ore was also being developed at the property of the Katherine Extension Mining Co., and sinking was continued from the 250-foot level.

Wallapai district (*Cerbat, Chloride, Kingman, Mineral Park, Stockton Hill*).—Twenty-eight mines in the Wallapai district produced 10,056 tons of ore, yielding $42,055 in gold, 75,470 ounces of silver, 80,728 pounds of copper, 697,805 pounds of lead, and 1,669,266 pounds of zinc, valued in all at $281,469, or $27.99 in metals a ton. More than half the output was lead-zinc ore shipped from the Fountain and other property of the Arizona Premier Mines Co., 12 miles north of Kingman. The mine was operated until October, and more than 5,000 tons of ore containing approximately 19 per cent of zinc and 3 per cent of lead, with some gold and silver, was shipped to Midvale, Utah, for custom milling. The chief minerals are galena, sphalerite, and chalcopyrite. Late in the year the Bevis Divide Mining Co. was organized to take over 28 claims north of Kingman, including the property formerly operated by the Arizona Premier Mines Co. The company shipped four cars of lead-zinc ore to a custom milling plant. The Banner & Prince George property was operated by the Comstock Silver Mining Co. The output consisted principally of silver ore shipped for smelting, but several hundred tons of lead-zinc ore was shipped to Midvale, Utah, for milling. The company erected a new flotation plant which was operated early in 1927. The Golconda Mining Co. treated ore in its 100-ton flotation plant and shipped about 10 cars of zinc concentrate. Zinc ore was produced from the Twentieth Century (Beebe) group, 2 miles southeast of Chloride. Silver ore was shipped from the Altata, Home Pastime, Pinkham, St. Louis, Cupel, Paymaster, and Silver Reef properties, lead ore from the St. Louis, Quail & Bonanza, Cupel, Elkhart, and Champion properties, and oxidized copper ore from the Emerald Isle mine.

There was considerable activity in prospecting for lead-zinc ore, and shipments were made from the C. O. D., New London, and other mines of the Hayes Nevada Mining Co., and from the Tennessee mine of the Arizona Lead Mines Co. Several lots of gold ore were shipped from the Rico, Mohawk, and Dixie Queen claims. The Chloride Mining Co. built a 200-ton flotation plant designed to treat lead-zinc-copper ore from the Hidden Treasure mine and custom ore from the Tennessee mine.

PIMA COUNTY

In 1926 the mine production of all metals in Pima County except zinc increased in quantity, but the number of mines declined from 48 to 43. The largest increase was in the output of copper from the low-grade disseminated ores mined in the Ajo district and treated by leaching and concentration. The ore output of the county increased from 3,367,586 to 3,430,263 tons, gold from $304,395 to $383,447, silver from 272,947 to 300,272 fine ounces, copper from 74,783,386 to 85,432,999 pounds, lead from 897,057 to 2,256,916 pounds, and total value of metals from $11,192,911 to $12,711,990. No zinc was produced in 1926. The concentrating ores (2,325,286 tons) yielded 104,698 tons of concentrates, which had a total value in metal of $9,490,592 and were nearly all from Ajo. Ore of shipping grade aggregated 29,665 tons and yielded metals valued at $641,789. Old tailings (1,302 tons), containing gold, silver, copper, and lead, were shipped to El Paso, Tex. Small lots of miscellaneous ore, mined by lessees and small operators from neighboring districts in Pima and Pinal Counties, were handled through the Tucson Chamber of Mines and shipped in bulk to El Paso, Tex. Amalgamation plants treated 187 tons of ore that yielded gold and silver bullion having a total value of $4,576. The placer output amounted to $270 in gold and 2 ounces of silver.

Ajo district.—According to the printed report of the New Cornelia Copper Co., the output of the property in 1926 was 82,312,463 pounds of fine copper, 234,139 ounces of silver, and 18,113.97 ounces of gold. The ore concentrated amounted to 2,325,256 dry tons, averaging 1.629 per cent of copper (1.409 per cent sulphide and 0.220 per cent oxide of copper). Of the total ore mined 1,073,823 tons was carbonate ore averaging 1.20 per cent of copper, which was leached. The soluble copper in the carbonate ore averaged 1.119 per cent and the insoluble copper 0.081 per cent. The leached ore yielded 17,405,991 pounds of electrolytic copper and 836,282 pounds of cement copper. The concentrating plant treated an average of 6,441 tons of ore a day, or 28.82 per cent more than its designated capacity. The flotation concentrate contained 64,070,190 pounds of copper. No mention was made in the report for 1926 of development work or ore reserves, but at the end of 1925 the company reported 3,277,028 tons of carbonate ore and 52,219,427 tons of sulphide ore. Diamond drilling was done in new territory, and a new low-grade ore body was said to have been opened in August. The net income for 1926, after various expenses and $603,678 for depreciation were deducted, was $3,714,547. Dividends paid to stockholders in 1926 amounted to $2,880,000, making a total, since 1918, of $10,530,000.

The property is equipped with a 5,000-ton leaching plant, which was operated at half capacity in 1926, and a 5,000-ton flotation plant, and the yearly production has increased considerably since concentration of the sulphide ore was begun in 1924. The oxidized ore contains practically no gold or silver, but since the company began treating the sulphide material the property has become an important producer of both metals.

Amole district.—Small lots of lead ore were produced from several prospects and shipped to El Paso, Tex., through the Tucson Chamber of Mines.

Arivaca district.—A little lead ore and concentrate was shipped from the Rosebud property, owned by the Oreona Development Co.

Baboquivari district.—Several lots of copper ore, silver ore, and gold ore were shipped by lessees from various claims, but the chief output was that of the Chance group or Allison mine, which produced gold ore that was treated by amalgamation. The property was leased in February to the Tom Reed Gold Mines Co., which did about 1,500 feet of development work and is building a 30-ton mill equipped for gravity concentration and flotation. Late in the year an ore body 150 feet long and 5 feet wide, extending from the 300 to the 500 foot level, was discovered; it contained 6,000 tons of oxidized ore valued at about $30 a ton.

Cababi district (*Comobabi*).—The Como Pima Mining Co. shipped two cars of sulphide copper-lead ore from the Little Mary mine, 8 miles north of Sells, and a small test lot of silver ore was shipped from the Comobabi property.

Cerro Colorado district.—Test lots of silver ore and lead ore were shipped from the Cerro Colorado and San Clements claims.

Empire district.—Seven lode mines in the Empire district produced 3,461 tons of lead ore and old tailings, which yielded $2,764 in gold, 24,983 ounces of silver, 32,066 pounds of copper, and 1,566,272 pounds of lead, valued in all at $148,144, or $42.80 in metals a ton. The first-class oxidized lead ore had an average value of about $59 in metals a ton. The most important producer in the district was the Lone Mountain mine, from which several hundred tons of oxidized lead ore was shipped. Shipments of lead ore were also made from the Forty-nine, Red Top, Lead Carbonate, Verde Queen, Total Wreck, and Pantano properties. More than 1,000 tons of old tailings, containing about 7 ounces of silver to the ton and 1 per cent of copper and 6 per cent of lead were shipped from the mill dump of the Total Wreck property.

Greaterville district.—The output of the Greaterville district consisted of a little sulphide lead ore from the Magdalena claim and placer gold mined by Mexicans. The Midland Copper Co. started the development of the Conglomerate property in July and did more than 500 feet of shaft sinking and drifting.

Helvetia district.—Five lode mines in the Helvetia district produced 73 tons of ore, yielding gold, silver, copper, and lead and averaging

$24.18 in metals a ton. A little oxidized copper ore was shipped from the Copper Duke mine and lead ore from the Navarro, Fairview, and Bimetallic properties.

Papago district.—A small test lot of lead ore was shipped by the Ramsdell Mines Co.

Pima district (*Olive, San Xavier, Twin Buttes*).—Five lode mines in the Pima district produced 7,952 tons of ore, yielding $381 in gold, 15,194 ounces of silver, 1,178,971 pounds of copper, and 2,576 pounds of lead, valued in all at $175,124, or $22.02 in metals a ton. Nearly all the output was first-class copper ore from the Copper Queen mine of the Midland Copper Co. The company did 3,800 feet of development work and paid a dividend of $18,750 in 1926, or a total to date of $126,150. The mine was abandoned in October, although it had been a steady producer since 1923. Small lots of ore were also shipped from the Olive Camp and Purta de Plata claims. At the Swastika group, 21 miles from Tucson, more than 600 feet of crosscutting and drifting was done.

Quijotoa district.—One lot of sulphide lead ore was shipped from the McCabe property.

Santa Rosa district.—A small lot of lead ore rich in silver was shipped from the Weaver claim through the Tucson Chamber of Mines.

Silver Bell district.—Four lode mines in the Silver Bell district produced 18,626 tons of ore, yielding $81 in gold, 12,868 ounces of silver, 1,828,274 pounds of copper, and 638,415 pounds of lead, valued in all at $315,142, or $16.92 in metals a ton. The largest part of the production was that of the El Tiro mine, owned by the Western American Mines Co., which shipped nearly 18,000 tons of oxidized copper ore and lead ore to smelters at Hayden, Ariz., and El Paso, Tex. The mine is opened by 8 miles of underground workings, and about 6,000 feet of development work was done in 1926. Several hundred tons of copper ore was shipped from the Imperial mine, which was a large producer in the past, especially from 1904 to 1910 and from 1916 to 1919. A small test lot of lead ore was shipped from the Esperanza mine.

PINAL COUNTY

In Pinal County 35 mines, 11 less than in 1925, produced 3,227,217 tons of ore and old tailings, a decrease of 59,130 tons. The gold declined from $220,976 to $214,849 and copper from 102,858,322 to 99,140,869 pounds. Silver increased from 890,322 to 1,111,018 fine ounces and lead from 574,546 to 1,027,255 pounds, but the total value of metals decreased from $15,494,727 to $14,870,026. Most of the ore came from the mines at Ray, and nearly all of it, or 3,164,669 tons, was of concentrating grade and yielded 297,553 tons of copper concentrates and 1 ton of siliceous gold concentrate. First-class ore (62,238 tons) and old tailings (310 tons) were smelted.

Banner district.—One lot of sulphide lead ore was shipped from the Alvarado mine in that part of the Banner district that extends into Pinal County. The total output of the district is given under Gila County.

Bunker Hill district (*Copper Creek*).—Six lode mines in the Bunker Hill district produced 1,778 tons of ore yielding $1,033 in gold, 25,372 ounces of silver, 149,300 pounds of copper, and 587,955 pounds of lead, valued in all at $84,803, or $47.70 in metals a ton. Nearly half the output was copper ore from the property of the Magma Chief Consolidated Copper Co., most of which was treated in a small concentration mill. Copper ore was also shipped by a lessee from the dump of the Copper Giant mine, owned by the Calumet & Arizona Mining Co., and several hundred tons of lead ore was shipped from the Blue Bird mine by the Twin S. Mining Co. Three cars of sulphide copper-lead ore and copper ore were shipped from the Bunker Hill mine while the company was doing assessment work.

Casa Grande district.—Five lode mines in the Casa Grande district produced 882 tons of ore and old tailings, yielding $48 in gold, 13,172 ounces of silver, 1,720 pounds of copper, and 15,220 pounds of lead, valued in all at $9,726, or $11.03 in metals a ton. Most of the output was first-class smelting ore containing considerable silver. Siliceous silver ore, as well as old tailings, was shipped from the Silver Reef property 12 miles from Casa Grande; this property produced much silver ore in 1925. Lead ore was shipped from the Mineral World, Lake Shore, and Orizaba claims.

Goldfields district.—The Mammoth mine of the Young Mines Co. was idle, but a little concentrate from gold ore was shipped from the Goldfields district.

Mineral Creek district (*Ray, Kelvin*).—Practically all the output of the Mineral Creek district was that of the Ray mine, operated by the Ray Consolidated Copper Co. from January to May 31 and by the Nevada Consolidated Copper Co. the remainder of the year. The property produced 2,968,277 tons of ore averaging about 1.52 per cent of copper, of which 2,957,200 tons was treated at the Hayden mill, and 11,077 tons of ore, averaging nearly 2 per cent of copper, was shipped to the smelter for converter lining. The mining cost was 81.2 cents a ton, as compared with 98 cents a ton in 1925. These costs do not include depreciation and taxes but include all other overhead expenses. The flotation plant at Hayden treated on the average 8,102 tons of copper ore daily, a total of 2,957,200 dry tons for the year. The mill ore yielded 223,521 dry tons of concentrate averaging 15.873 per cent of copper. The milling cost, excluding depreciation and all taxes, but including all other expenses, as well as the cost of coarse crushing which is done at the mine, was 54.3 cents a ton, as compared with 63 cents a ton in 1925. The gross copper contained in the concentrate was 70,960,335 pounds, as compared with 76,947,957 pounds for 1925; other crude ore, with precipitates, shipped to the smelter contained 433,343 pounds of copper. The net production for the year from all sources, after allowing for smelter deduction, was estimated to be 69,925,091 pounds, as compared with 74,691,091 pounds for 1925. The reserves are estimated at 70,000,000 tons of ore containing approximately 2.07 per cent of copper; more than 31,000 feet of development work was done in 1926. The 12,000-ton concentration-flotation plant at Hayden was run the entire year, and the concentrates with some crude ore were shipped to Hayden for smelting. The following paragraphs are taken from the company's printed report:[7]

> No drilling was done at Ray mines during the year, but some exploration was carried on from the underground workings following favorable indications beyond the limits of the previously developed ore body. Results to date have been encouraging in the development of limited additional tonnage, as well as assuring further and substantial tonnages of ore of economic value.

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[7] Nevada Consolidated Copper Co. Twentieth Ann. Rept., for year ended Dec. 31, 1926.

The excavation and concreting of the new pocket on the fourth and final level at the No. 2 main hoisting shaft was completed, and the mechanical equipment is now being installed. * * *

All ores are produced from underground workings, and the total mining cost for the year was greatly reduced. * * *

The installation of the flotation apparatus and auxiliaries within the main building of the Hayden concentrator was completed early in the year, and of the total of eight sections seven sections which are now reconstructed have an average daily capacity somewhat in excess of 10,000 tons.

In addition to the acquisition of the Ray and Chino properties, negotiations were concluded early this year with the Ray Hercules Mines (Inc.), for the purchase of all its properties in Arizona, consisting of mines and mining claims adjoining or adjacent to the Ray mines.

One car of oxidized copper ore was shipped to Hayden from surface cuts on the Dunham prospect and a little lead ore from the Teft & Moore property.

Old Hat district.—One small lot of sulphide copper ore containing considerable silver was shipped from the Pearl group, owned by the Dripping Springs Mines Consolidated.

Owl Head district.—The output of the Owl Head district included one car of copper ore from the Red Tinker prospect, newly opened by a 400-foot tunnel, and a test lot of oxidized copper ore from the Vaquero claim.

Picacho district.—The Baltimore claim near Wymola on the Southern Pacific Railroad produced one car of oxidized copper ore, which was shipped to Hayden for smelting.

Pioneer district (Superior).—Thirteen lode mines in the Pioneer district of Pinal and Gila Counties produced 258,269 tons of ore, yielding $192,406 in gold, 1,001,589 ounces of silver, 29,054,847 pounds of copper, and 435,832 pounds of lead, valued in all at $4,919,942, or $19.05 in metals a ton. Most of the output was copper ore of milling grade, but 48,903 tons was first-class shipping ore, largely from the property of the Magma Copper Co. The company has been a large producer of copper since 1912, when high-grade sulphide copper ore was opened. The property is extensively developed by 101,964 feet of workings, and 14,483 feet of drifting, crosscutting, raising, and sinking was done in 1926. The mine is equipped with a 600-ton gravity concentration and flotation mill, which ran continuously and had an average extraction of 96.93 per cent of copper. Both crude ore and concentrate, as well as some custom material, were smelted in the company's 450-ton copper plant at Superior. An article[8] describing this plant appeared in April. According to the annual printed report of the company, the Magma mine produced 248,787 tons of ore containing an average of 6.27 per cent of copper and of 2.78 ounces of silver and 0.028 ounce of gold to the ton. Lessees also shipped 134 tons of ore from the Superior mine that assayed 8.26 per cent of copper and 0.26 ounce of silver and 0.017 ounce of gold to the ton. Custom ores and concentrates purchased from various sources amounted to 3,063 tons. The total smelter output, chiefly from Magma ore and concentrate, after deduction of all losses, including refining, was 29,135,132 pounds of copper, 860,184 ounces of silver, and 9,100.16 ounces of gold, of which 65,242 pounds of copper, 61,638 ounces of silver, and 71.60 ounces of gold were produced from ores purchased. The net cost of producing copper, after deduction of the value of gold and silver, was 7.903 cents a pound. The cost does not include any allowance for depreciation or Federal taxes but includes State and county taxes amounting to nearly 1 cent a pound and all other fixed and general expenses. The average net selling price received for copper in excess of all commissions and delivery charges was 13.903 cents a pound.

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[8] Austin, L. S., "Features of the Magma copper smelter": Eng. and Min. Jour.-Press, vol. 121, Apr. 17, 926, p. 643.

The average output from the Magma mine was 686 tons of ore a day. Above the 650-foot level 2,208 tons of oxidized ore was mined that averaged 8.90 per cent of copper and 6.46 ounces of silver and 0.0675 ounce of gold to the ton. The company report for 1926 says:

> During the year No. 3 shaft was sunk 259 feet to a depth of 106 feet below the 2,550 level. This shaft is now down to a depth of approximately 2,656 feet below the collar of No. 1 shaft.
>
> No. 5 shaft was sunk to a depth of 543 feet below the 500 or tunnel level. No. 5 shaft was also raised and stripped from the tunnel level to the surface, a distance of 101 feet. * * *
>
> No. 21 west winze was sunk from the 2,250 level to the 2,550 level, a distance of 301 feet. * * *
>
> No. 4 shaft was enlarged by one 5 by 6 foot compartment from the 650 level to the surface. The approximate distance was 630 feet. It is the plan to concrete this enlarged section this year.
>
> The main crosscut on the 2,550 level was completed early in 1926, and a station on this level was completed at both No. 2 and No. 3 shafts. The 2,550 west footwall drift was driven to a point approximately 2,260 feet west of the main crosscut of the 2,550 level. The main north and south fault of this district was encountered in this drift approximately 2,225 feet west of the main crosscut. From the face of the 2,550 west footwall drift a crosscut is being driven south to connect with No. 5 shaft. This crosscut was driven 230 feet during 1926. There is approximately 800 feet more to drive before this crosscut will be at a point directly below the place where No. 5 shaft is being sunk. The crosscut will reach this point in a few months, and No. 5 shaft should connect with it some time in 1928.
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> In the driving of the west 2,550 level footwall drift considerable faulting was encountered. * * * The vein is about 30 feet wide. On the footwall there is 7.75 feet assaying 7.17 per cent copper, 2.25 ounces silver, and 0.035 ounce gold. The mineral is mostly bornite. The balance of the crosscut shows low-grade ore.

Dividends paid to stockholders by the Magma Copper Co. from its organization to the end of 1926 amounted to $3,540,698, of which four dividends totaling $1,224,465 were paid in 1926; a dividend of $306,116 was declared payable January 15, 1927. The balance on December 31, 1926, was $775,512.

The Reymert mine, 8 miles southwest of Superior, became an important producer by marketing 5,000 tons of siliceous silver ore which was shipped for smelting. Considerable work was done at the Silver Bell mine under lease by the Silver Bell Syndicate, which shipped nearly 1,000 tons of sulphide lead ore from Price to El Paso, Tex. The company has several thousand tons of first-class ore and mill ore in reserve and did about 500 feet of development work. Three cars of first-class silver ore were shipped to the Magma plant from the Doggs group of the Belmont Copper Mining Co., which did about 5,000 feet of development work as well as considerable diamond drilling. Siliceous silver ore was shipped from the Bomboy and Nellie D. claims and small lots of sulphide lead ore from the Ajax and Sims properties.

Ripsey district.—Several hundred tons of silver ore was shipped from the Shawmut mine from Wooley on the Southern Pacific Railroad to the smelter at Hayden.

Riverside district.—A little sulphide copper ore was shipped from the Thanksgiving claim and one car of gold ore from the Dietrich property.

Saddle Mountain district.—Several hundred tons of silver ore containing a little gold was shipped by lessees from the Blue Bird claim, owned by the Adjust Mining Co. The deposits of the district are described in a bulletin [9] of the United States Geological Survey.

SANTA CRUZ COUNTY

Twenty-nine lode mines in Santa Cruz County produced 3,557 tons of ore, or 29 tons less than was reported from 37 mines in 1925. Ore of shipping grade amounted to 2,407 tons and yielded metals valued at $75,058. Ore to concentrating mills amounted to 1,150 tons and produced 281 tons of lead concentrate yielding metals valued at $23,549. The total value of the metal output of the county decreased $30,559.

Harshaw district.—Six lode mines in the Harshaw district produced 1,160 tons of ore, yielding $139 in gold, 16,105 ounces of silver, 5,388 pounds of copper, and 209,362 pounds of lead, valued in all at $27,692, or $23.87 in metals a ton. Several hundred tons of silver-lead ore was milled at the Big Jim property, the resulting concentrate being shipped to El Paso, Tex. A 75-ton flotation plant was completed in August. Most of the crude smelting ore shipped from the district was sulphide lead ore from the Hardshell, Flux, and World's Fair properties. A little lead ore was also shipped from the January & Norton property and the Josephine mine. The Garfield, California, and Allis property was operated under lease, and more than 500 feet of development work was done.

Oro Blanco district.—The mines of the Oro Blanco district were practically idle, but more than 600 feet of drifting, crosscutting, and sinking was done at the Idaho group, operated by the North Star Mining & Development Co. The company also installed a 25-ton flotation plant, which was being tested late in the year. No concentrates, however, were marketed.

Pajarito district.—Four mines in the Pajarito district made an output of 58 tons of lead ore, yielding $23 in gold, 432 ounces of silver, 41 pounds of copper, and 15,538 pounds of lead, valued in all at $1,542, or $26.59 in metals a ton. A little lead ore was shipped from the Sunset, Ben Daniels, and Morning claims, and a little lead ore and concentrate from the Big Steve property.

Patagonia (Washington, Duquesne) district.—Six lode mines in the Patagonia district produced 1,135 tons of ore, yielding $402 in gold, 3,425 ounces of silver, 88,366 pounds of copper, and 120,607 pounds of lead, valued in all at $24,559, or $21.64 in metals a ton. The entire product was first-class shipping ore. Shipments of oxidized lead ore from the Mowry mine and sulphide copper ore from the Santo Nino property represented most of the output. About 1,500 feet of development work in drifts and raises was done in the Mowry deposit, which occurs between limestone and monzonite. About 200,000 tons of low-grade silver-lead ore was said to be exposed. The Santo Nino mine was operated by lessees most of the year but was worked on company account after September 1. It is estimated that the property has about 5,000 tons of ore containing 8 per cent of copper. Small lots of ore were shipped from the Duquesne, Gladstone, and Kino properties.

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[9] Ross, C. P., Ore Deposits of the Saddle Mountain and Banner Mining Districts, Arizona: U. S. Geol. Survey Bull. 771, 1925, 72 pp.

Tyndall district (*Alto*).—Nine lode mines in the Tyndall district produced 1,105 tons of ore, yielding $693 in gold, 13,845 ounces of silver, 25,588 pounds of copper, and 359,456 pounds of lead, valued in all at $41,671, or $37.71 in metals a ton. The most important producer was the Jefferson mine, from which rich lead ore was shipped, and several cars of lead concentrate were shipped from the Eureka property. Several cars of oxidized lead ore and copper-lead ore were shipped from the Alto group, some sulphide material from the Joplin and Victor claims, and a little silver ore from the Rosario property. A little copper ore and copper-lead ore was shipped from the Apache claim.

Wrightson district.—The Dixie Queen and Mansfield No. 2 claims produced sulphide lead ore, which was shipped to El Paso, Tex., for smelting.

YAVAPAI COUNTY

The mine production of all metals in Yavapai County showed large gains in quantity, but the value of silver and copper decreased. There were 78 mines producing, 10 more than in 1925. The output of ore and old tailings increased from 1,544,507 to 1,595,826 tons, gold from $1,349,217 to $1,496,546, silver from 2,762,143 to 2,770,949 fine ounces, copper from 154,017,340 to 155,368,073 pounds, lead from 510,893 to 731,614 pounds, zinc from 184,466 to 3,985,491 pounds, and the total value from $25,195,073 to $25,334,589. The large increase in zinc was due to the regular shipments of zinc ore from the Copper King mine, owned by the Arizona Hillside Development Co.

Of the first-class ore shipped to smelters 1,556,347 tons, or all but 1,423 tons, was sulphide ore. The smelting ore yielded on the average $15.96 in metals a ton. The concentrating ores (28,889 tons) yielded 8,160 tons of concentrates which, with 8 tons of concentrate from gold and silver mills, had a total value in metals of $347,976. Gold and silver bullion valued at $7,925 was recovered from 439 tons of ore treated in amalgamation and cyanidation plants, and 8,728 tons of old tailings shipped for smelting yielded gold, silver, and copper valued at $62,663. The placer output was $4,706 in gold and 38 ounces of silver, as against $2,351 in gold and 13 ounces of silver in 1925.

Agua Fria district.—The Binghampton property, formerly a large producer of copper, was operated a short time under lease, and several thousand tons of crude copper ore and concentrate was shipped to Humboldt. Two cars of sulphide copper ore were shipped from the Minor property, where considerable work was done in crosscutting and drifting by the Arizona Redlands Copper Co. The dump on the property is estimated to contain about 50,000 tons of 2 per cent copper ore.

Big Bug district.—Two placers and 15 lode mines in the Big Bug district produced 44,617 tons of ore and old tailings, $59,670 in gold, 59,695 ounces of silver, 1,953,501 pounds of copper, and 24,085 pounds of lead, valued in all at $372,337. The ore was valued at $8.33 in metals a ton. Of the total ore produced 40,272 tons was directly smelted, from which 1,963.34 ounces of gold, 49,111 ounces of silver, 1,884,481 pounds of copper, and 9,635 pounds of lead were recovered; 200 tons of ore was concentrated, making 36 tons of lead concentrate, which yielded 2.60 ounces of gold, 2,425 ounces of silver, 176 pounds of copper, and 14,450 pounds of lead. A small quantity of gold and silver bullion was recovered at amalgamation and cyanidation plants, and 2,913 tons of old tailings from the McCabe mill dump, containing gold, silver, and copper, was shipped to the smelter at Hayden. The most important producer was the Blue Bell mine of the Southwest Metals Co., from which several thousand tons of copper ore was shipped for smelting at Humboldt. The Henrietta mine of the Huron Copper Co. produced about 200 tons of copper ore and gold ore through the work of lessees. The Gladstone-McCabe property was operated a short time, but most of the output was old siliceous tailings containing gold, silver, and copper shipped for smelting. A little silver ore was shipped from the dump of the Kit Carson mine, old tailings containing gold, silver, and copper from a dump at Providence, copper ore from the Mountain Chief and Blue Ribbon properties, and a little lead concentrate from the Lookout and Arizona National mines. The concentrate from the mill on the Arizona National property contained more than 100 ounces of silver to the ton. A few tons of gold ore from the Poland mine was amalgamated in a small mill. Placer gold valued at $842 with 8 ounces of silver was recovered from claims on Big Bug Creek near Huron. Bullion having a fineness of 0.952 was recovered by sluicing operations of the Uncle Dudley Mining Co.

Black Canyon district.—The output consisted of one small lot of ore containing nearly 400 ounces of silver to the ton from the Good Luck claim and a car of lead-zinc ore from the Snaefell property on Poland Creek 2 miles south of Cleator, which was shipped to Utah for custom milling. At the property of the Kay Copper Corporation near Canon more than 9,000 feet of development work was done.

Black Hills district.—One car of gold ore containing a little silver was shipped from the Red Bird property.

Black Rock district.—The Copper Blossom property near Constellation produced a small test lot of oxidized copper ore, and the Monte Cristo property produced a little ore that was melted into a silver bar for display but was not marketed. The Monte Cristo mine was operated by the New Monte Cristo Mining Co., and 2,000 feet of work was done in the course of development. The property is opened by an inclined shaft 1,100 feet deep, and 20,000 feet of drifting has been done.

Cherry Creek district.—There was little activity in the Cherry Creek district, but two lots of copper ore were shipped from the Copper King and other claims near Cherry. The New United Verde Copper Co. continued to develop the Logan mine by more than 400 feet of drifting.

Copper Basin district.—A little gold ore from the Cross, Gold Hill, and Boston claims was treated by amalgamation in a three-stamp mill.

Eureka district.—Five lode mines in the Eureka district produced 5,134 tons of ore, yielding $2,687 in gold, 29,065 ounces of silver, 126,557 pounds of copper, 353,207 pounds of lead, and 3,949,154 pounds of zinc, valued in all at $362,985, or $70.70 in metals a ton.

With the exception of a little gold ore from the Nieman & Crosby property treated by amalgamation, the entire output was first-class smelting ore. The greater part of the output was sulphide zinc ore containing silver, copper, and lead from the Copper King mine, owned by the Arizona Hillside Development Co. The mine is extensively developed and was a large producer of zinc from 1917 to 1920. Nearly 800 feet of development work was done during the year, and the ore was hauled 30 miles east to Hillside, on the Atchison, Topeka & Sante Fe Railway, whence it was shipped to Amarillo, Tex. The mine is said to have in reserve about 27,000 tons of positive and probable ore. Several lots of first-class lead ore were shipped from the Lawrence and Galena Silver properties.

Hassayampa district.—One placer and 11 lode mines in the Hassayampa district produced 1,521 tons of ore, $10,179 in gold, 11,670 ounces of silver, 133,364 pounds of copper, 51,038 pounds of lead, and 25,987 pounds of zinc, valued in all at $42,164. The ore had a value of $26.82 in metals a ton. The placer gold was recovered from various gulches along the Hassayampa River. About half the output was sulphide copper ore shipped by lessees from the Storm Cloud mine, 12 miles from Prescott. Reserves are estimated at 50,000 tons of ore containing 3 per cent of copper and 4 ounces of silver to the ton. A little gold ore from the Golden Eagle and Dexter properties was treated by amalgamation, and several cars of first-class ore were shipped from the Black, Dunkirk & Davis, Osage, and Arizona Comstock properties. A large amount of development work was done at the Osage property, and about 5,000 tons of ore containing 10 per cent of lead and 5 ounces of silver to the ton is said to be in reserve. Several cars of low-grade ore containing gold, silver, and copper were shipped by lessees from the mine dumps of the Senator group owned by the Phelps Dodge Corporation. The output of the Ruth mine, which was operated by the California Leasing Co., consisted of lead ore and concentrate shipped to El Paso, Tex., and lead-zinc ore shipped to Midvale, Utah, for custom milling. More than 600 feet of development work was done at the property of the Sunny South Silver Lead Mines Co.

Martinez district.—The Congress mine, 3 miles north of Congress, owned by the Sonora Development Co., was operated a short time by lessees, who shipped several cars of gold ore. Late in the year the Sonora Development Co. operated a small mill and shipped two cars of gold concentrate.

Peck district.—A small quantity of silver ore from the Peck group was tested by cyanidation, and several hundred tons of copper ore was shipped by lessees from the De Soto property, owned by the Southwest Metals Co.

Pine Grove district.—One car of lead concentrate containing considerable gold and silver was shipped from the Blue Bird property, and a few tons of ore from the dumps of the Lincoln mine near Crown King was tested in an amalgamation-concentration plant.

Silver Mountain district.—Rich gold ore was discovered at the Monte Carlo property, and a little gold bullion was recovered by an arrastre.

Thumb Butte district.—A little development work was done at the Garbarino claim near Prescott, and one lot of siliceous gold ore was shipped to Humboldt.

Tiger district.—One car of sulphide copper ore was shipped from the dump of the Springfield mine near Crown King.

Tip Top district.—The Kay Copper Corporation continued to develop the Copper Bar group near Canon, and 11,000 feet of drifting and sinking was reported.

Turkey Creek district (*Bolada*).—One lot of low-grade sulphide copper ore containing considerable silver was shipped from the Goodwin claim, 1 mile north of Bolada.

Verde district (*Jerome*).—The value of the metal output of the Verde district was second only to that of the Globe-Miami district, which held the record in 1926. The output consisted of copper ore of smelting grade from the United Verde and United Verde Extension properties, from which gold, silver, and copper were recovered. The larger part of the output was the production of the United Verde mine, but as the company issued no printed report the district output is not published. The geology of the district is discussed in detail in a bulletin [10] issued in 1926.

The United Verde Copper Co. shipped material that was chiefly sulphide copper ore from Jerome to its 5,000-ton smelting plant at Clarkdale, which was active continuously. The mine, operated the entire year, produced more gold, silver, and copper than any other property in Arizona, and the company paid dividends aggregating $2,400,000. The smelting plant produced from 4,000 to 5,000 tons of copper bullion a month, which was rich in gold and silver. At the surface the open pit was operated by steam shovel, and the mine is worked underground to a depth of 3,150 feet. More than 15,000 feet of development work was done during the year, and much stripping and blasting was done at the surface near that part of the mine which has been on fire for 20 years. After exhaustive milling tests construction of the first unit of the new flotation plant at Clarkdale was started in December. A good description [11] of the proposed plant, giving the flow sheet, was published late in the year.

Operations of the United Verde Extension mine and smelter continued throughout the year. A total of 43,041,576 pounds of copper was produced from smelting 198,911 dry tons of crude ore. The ore smelted averaged 10.70 per cent of copper and 0.042 ounce of gold and 1.78 ounces of silver to the ton. The cost per pound of producing copper in 1926 included these charges: Mining, 2.51 cents; smelting, 2.10 cents; freight on ore, 0.09 cent; freight (on bullion), refining, and selling, 1.76 cents; and other expenses, 0.01 cent; a total of 6.47 cents a pound. This cost does not include charges for depreciation, depletion, or taxes. Gross revenue from metals and ore produced amounted to $6,330,753, which, when added to other revenue ($304,527), amounted to $6,635,280. Deductions of charges for mine and smelter operation, freight, refining, selling, and other expenses, including taxes, amounted to $3,404,797. Earnings from operations were $3,230,483, less depletion and depreciation of $2,980,169, leaving a net profit of $250,314 to surplus. Dividends paid to stockholders in 1926 amounted to $3 a share, or $3,150,000. Of this amount 37.53 cents a share was paid out of earned surplus and $2.625 a share was paid out of depletion reserve account. The total dividends paid since the organization of the company in 1916 to the end of 1926 amounted to $27,405,000, or $26.10 a share. More than 19,000 feet of development work was done during the year, chiefly in drifting, together with a large amount of diamond drilling. Work in the upper levels of the mine to the west has proved the extension of the ore bodies, but on the 1,800 and 1,900 levels the work done so far has not encountered an ore body of commercial grade. It is expected, however, that ore will be developed as the work progresses. The Edith shaft was therefore sunk 137 feet below the 1,900-foot level. Figures of ore in reserve are not given in the company's printed report, but it was stated that the ore reserves and contents in 1926 were equal to those of two years ago. At the smelting plant reverberatory furnace No. 1 was operated 222 days and No. 2, 310 days. The company continued to develop the Jerome Verde ground and 1,646 feet of work in drifts and raises was done in 1926 besides 1,234 feet of diamond drilling. No ore was found, and the work under contract with the Jerome Verde Co. was completed. Development of the Bisbee Queen group of claims in the southern end of the Warren district (Cochise County) was started and a shaft will be sunk as soon as possible.

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[10] Lindgren, W., Ore Deposits of the Jerome and Bradshaw Mountains Quadrangle, Arizona: U. S. Geol. Survey Bull. 782, 1926, 192 pp.

[11] Lanning, John E., "United Verde's new concentrator": Eng. and Min. Jour., vol. 122, Dec. 18, 1926, p. 976.

No ore was shipped from the Verde Central mine,[12] which joins the United Verde property on the south and comprises 38 mining claims covering 523 acres. So far as known, the ore, averaging 1 to 20 per cent of copper, is confined to the igneous rocks that contain a mixture of chalcopyrite and pyrite in a siliceous gangue.

The property is opened by two shafts; the deeper shaft, which is vertical, has been sunk to a depth of 1,946 feet and has three compartments. A total of 9,414 feet of development work was done during the year in drifting, crosscutting, raising, and shaft sinking. The main work, however, was sinking the three-compartment vertical shaft from the 1,450-foot level to the 1,900-foot level and cutting stations on the 1,600, 1,750, and 1,900 levels. The following paragraphs are from the annual report of the Calumet & Arizona Mining Co.

> Much of the work was to develop the Rock Butte ore zone on the 600, 800, 1,100, 1,200, and 1,300 levels. * * * It varies in width from 10 feet to over 100 feet, being more siliceous at the top and with increasing sulphides coming in at depth.
>
> A very promising area along the quartz porphyry-greenstone contact is being developed on the 1,000 level in the Crown Point claim. * * * One block has been developed 60 feet long with a width of 5 feet on the level and has a raise 100 feet, high, three sides of which are in ore averaging 5 per cent copper.

At the Copper Chief mine more than 2,000 feet of diamond drilling was done during the year. The property, which is equipped with a 135-ton cyanidation plant, was a large producer of gold and silver in 1916, 1917, 1918, and 1923.

Walker (*Lynx Creek*) *district.*—Six mines in the Walker district produced 29,574 tons of ore and old tailings. Of this output 24,856 tons was ore of milling grade and yielded 7,389 tons of concentrate, containing gold, silver, copper, and lead. The ore of shipping grade amounted to 35 tons, containing the same metals. Gold and silver bullion valued at $462 was recovered from 33 tons of ore treated in amalgamation plants. About 4,600 tons of old tailings, containing gold, silver, and copper, was shipped to Hayden from a dump near

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[12] Verde Central Mines (Inc.), Calumet & Arizona Mining Co. Ann. Rept. for 1926.

Mayer. In addition, two placer operators produced $443 in gold and 3 ounces of silver. Altogether the output of the district was $70,482 in gold, 148,295 ounces of silver, 1,039,656 pounds of copper, and 280,440 pounds of lead, valued in all at $331,005. The ore and old tailings yielded on the average $11.18 in metals a ton. The most important producer in the district was the Sheldon mine, from which nearly 25,000 tons of copper-lead ore was milled in a 200-ton concentration-flotation plant that yielded copper concentrate and lead concentrate. The products are shipped from Poland on the Atchison, Topeka & Santa Fe Railway to Humboldt, Ariz., and El Paso, Tex. The mine is opened by an inclined shaft 850 feet deep, and 2,400 feet of development work was done during the year. About 80,000 tons of ore containing copper, lead, silver, and gold is said to be in reserve. One car of gold ore from the Little Rock claim near Walker was shipped for smelting.

Walnut Grove district (*Wagoner*).—Three placers and three lode mines in the Walnut Grove district produced 523 tons of ore, $1,425 in gold, 285 ounces of silver, 37,430 pounds of copper, and 13,598 pounds of lead, valued in all at $7,930. The ore had a value of $12.87 in metals a ton. The placer output, which was $1,197 in gold and 7 ounces of silver, came from claims on Oak Creek near Wagoner. The chief output of the district was that of the Zonia mine in French Gulch, 13 miles south of Kirkland, which produced several hundred tons of oxidized copper ore. The property was operated during the latter part of the year by the Arizona Metals (Inc.) and the early part of the year by the Zonia Mines Co. The deposit is said to contain a large quantity of low-grade carbonate ore.

Weaver district.—The output of the Weaver district was valued at $901, represented chiefly by placer gold recovered at the Weaver Gulch property near Octave. A test lot of gold ore was shipped from the Blue Bell mine and a sample lot of copper ore from the Mayflower property.

White Picacho district.—A little gold ore from the Producer claim was treated in an arrastre, and a small output of placer gold was recovered from property near Morristown. The Hassayampa Placer Gold Mining Co. owns a large acreage of placer ground as well as lode property on Buckhorn Gulch. The placer property was idle in 1926, but it is planned to treat the gravel by dredging.

YUMA COUNTY

The total value of the mine production of gold, silver, copper, and lead in Yuma County was $56,489 in 1926, as against $49,746 in 1925. There were declines in all the metals except gold, which increased from $10,024 to $21,947. Twenty-four lode mines, three more than in 1925, produced 2,504 tons of ore. The placer output was $870 in gold and 7 ounces of silver. Gold and silver bullion valued at $20,727 was recovered from 1,820 tons of ore treated in amalgamation and cyanidation plants. The chief producer in the county was the Fortuna mine, operated by the Elan Mining Co., from which several hundred tons of gold ore was treated in an amalgamation plant.

Castle Dome district.—Eight lode mines in the Castle Dome district produced 306 tons of ore, yielding $5 in gold, 4,286 ounces of silver, and 211,698 pounds of lead, valued in all at $19,616, or $64.10 in metals a ton. No placer production was reported in 1926. Of the total ore, 168 tons was milled, yielding 30 tons of concentrate containing silver and lead. First-class ore shipped to a smelter amounted to 138 tons. Several cars of lead ore and concentrate were shipped from the Sonora, Lady Edith, Mabel, and New Deal properties, and small lots of first-class lead ore were shipped from the Anna, Berndt, and Silver Dollar claims. The ore shipped from this district contained, on the average, nearly 65 per cent of lead.

Cienega district.—Four lode mines in the Cienega district produced 104 tons of copper ore, valued at $3,372, or $32.42 in metals a ton. The ore came chiefly from the Arizona McGinnis, Carnation, and Gier properties, 12 miles northeast of Parker. At the Rio Vista mine, 7 miles from Parker, 500 feet of development work was done during the year, and a 125-ton mill equipped for amalgamation and concentration was being installed early in 1927. Between 8,000 and 10,000 tons of ore is said to be blocked out.

Ellsworth district.—Five lode mines in the Ellsworth district produced 227 tons of ore, $2,037 in gold, 361 ounces of silver, 6,153 pounds of copper, and 53,608 pounds of lead, valued in all at $7,412, or $32.65 in metals a ton. A little copper ore and concentrate containing considerable gold was shipped from the Critic mine and one car of oxidized lead ore from the Brittania property. Three cars of sulphide lead ore were shipped by lessees from the Bonanza & Golden Eagle property, which has a 40-stamp mill equipped for amalgamation and concentration, and a little gold bullion from the Charlie Sam property was shipped to the mint at San Francisco, Calif. The Wenden Copper Mining Co. continued shaft sinking and reported striking gold-copper ore at a depth of 650 feet.

Fortuna district.—At the Fortuna mine, an old gold producer now operated by the Elan Mining Co., ore was treated in a 5-stamp mill equipped for amalgamation; bullion was shipped to California.

Laguna district.—A little exceptionally fine placer gold was recovered from claims near Dome.

Planet district.—Several lots of copper ore were shipped from the Planet and other lode claims 28 miles northwest of Bouse.

Plomosa district.—The output of two placers and two lode mines in the Plomosa district was valued at $2,333. The chief output was a car of copper ore containing silver from the Apache Chief property. At the Dutchman mine, owned by the Great Western Gold & Copper Mining & Milling Co., a new 50-ton mill was built, which is equipped for amalgamation and concentration. The property of the Old Maid Mining Co. was operated the entire year and about 800 feet of development work was done. More than 3,000 tons of gold ore is said to be in reserve.

Santa Maria district.—A small test lot of lead ore was shipped from the East Side property near Bouse.

Silver district.—At the James G. Blaine property, operated by the Silver Mines Consolidated, 200 tons of silver ore was treated by cyanidation. As the mill was small, a new 100-ton plant was designed, and was completed in June, 1927. About 500 feet of drifting was done at the Red Cloud mine.

GOLD AND SILVER

(GENERAL REPORT

By J. P. Dunlop

PRODUCTION

DOMESTIC PRODUCTION

Approximate distribution, by producing States and Territories, of the production of gold and silver in the United States in 1926

[Figures supplied by the U. S. Bureau of the Mint]

State or Territory	Gold		Silver	
	Fine ounces	Value [1]	Fine ounces	Value [2]
Alaska	325, 186	$6, 722, 200	707, 454	$441, 451
Arizona	232, 200	4, 800, 000	7, 516, 708	4, 690, 426
California	581, 700	12, 024, 800	1, 977, 956	1, 234, 244
Colorado	346, 297	7, 158, 600	5, 037, 574	3, 143, 446
Georgia	140	2, 900	11	7
Idaho	12, 640	261, 300	7, 563, 644	4, 719, 714
Illinois			3, 081	1, 922
Michigan			107, 094	66, 827
Missouri			71, 839	44, 827
Montana	57, 707	1, 192, 900	11, 974, 257	7, 471, 936
Nevada	170, 880	3, 532, 400	6, 450, 224	4, 024, 940
New Mexico	20, 105	415, 600	496, 634	309, 900
North Carolina	121	2, 500	22	14
Oregon	13, 303	275, 000	28, 861	18, 009
Pennsylvania	106	2, 200	1, 479	923
Philippine Islands	96, 426	1, 993, 300	45, 793	28, 575
South Carolina	15	300		
South Dakota	286. 961	5, 932, 000	82, 789	51, 660
Tennessee	416	8, 600	95, 783	59, 769
Texas	164	3, 400	463, 611	289, 293
Utah	181, 832	3, 758, 800	19, 936, 032	12, 440, 084
Vermont			1, 948	1, 216
Virginia	10	200		
Washington	8, 833	182, 600	155, 952	97, 314
	2, 335, 042	48, 269, 600	62, 718, 746	39, 136, 497

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[1] Gold valued at $20.67+ a fine ounce.

[2] Silver valued at 62.4 cents a fine ounce. Average New York price of bar silver.

The figures in this table were obtained through cooperation between the United States Bureau of the Mint and the Bureau of Mines and were agreed upon after conference and adjustment between the two bureaus. They are therefore final for both.

The totals are based on bullion deposits in the United States mints and assay offices and on returns to the Bureau of the Mint from the smelting and refining companies. The distribution is adjusted by means of information collected by the Bureau of Mines directly from the producing mines and tabulated for the mine reports discussed later. The data for the total production and in part for the distribution are obtained from records of (1) the unrefined domestic gold and silver deposited in United States mints and assay offices, (2) the domestic gold and silver in fine bars reported by private refineries, and (3) the unrefined domestic gold and silver contained in ore and matte exported for reduction. The last item is small.

Increase or decrease in production of gold and silver in the United States in 1926, by States

State or Territory	Gold		Silver	
	Fine ounces	Value	Fine ounces	Value
Alaska	+23, 974	+$495, 600	−58, 642	−$90, 220
Arizona	+27, 729	+573, 200	+145, 350	−425, 296
Arkansas	----------	----------	−2, 835	−1, 968
California	−60, 149	−1, 243, 400	−1, 262, 444	−1, 014, 594
Colorado	−10, 739	−222, 000	+602, 684	+65, 632
Georgia	−320	−6, 600	−36	−26
Idaho	−7, 334	−151, 600	−99, 793	−598, 711
Illinois	----------	----------	−593	−628
Michigan	----------	----------	−28, 827	−27, 502
Missouri	----------	----------	+27, 601	+14, 126
Montana	−26, 315	−544, 000	−622, 352	−1, 270, 111
Nevada	−9, 472	−195, 800	−396, 582	−726, 743
New Mexico	−9, 467	−195, 700	−303, 039	−245, 073
North Carolina	−764	−15, 800	−87	−62
Oregon	−5, 404	−111, 700	−6, 414	−6, 472
Pennsylvania	−15	−300	+21	−89
Philippine Islands	+4, 359	+90, 100	−2, 709	−5, 085
Porto Rico	−87	−1, 800	−195	−135
South Carolina	+15	+300	----------	----------
South Dakota	−1, 199	−24, 800	−15, 445	−16, 514
Tennessee	+58	+1, 200	−8, 520	−12, 617
Texas	+159	+3, 300	−91, 562	−95, 997
Utah	+663	+13, 700	−1, 304, 483	−2, 300, 833
Vermont	----------	----------	+1, 948	+1, 216
Virginia	+5	+100	−5	−3
Washington	−2, 632	−54, 400	−9, 613	−17, 588
Wyoming	−10	−200	−106	−74
	−76, 945	−1, 590, 600	−3, 436, 678	−6, 775, 367

Domestic smelters and refiners recovered 738,059 fine ounces of gold and 76,274,009 fine ounces of silver from foreign ores and bullion, an increase of 21,571 ounces of gold and 6,732,591 ounces of silver compared with the corresponding figures for 1925. The foreign ore came mainly from Mexico, Canada, and Peru.

The value of the new gold used in the arts and manufactures in the United States in 1926 was $43,268,236, or 90 per cent of the total production of the country, compared with $36,161,849 in 1925. The quantity of new silver used for such purposes was 29,407,601 fine ounces, or 47 per cent of the total production, compared with 29,929,163 ounces. The total quantity of silver (new and old) used in the arts and manufactures was 39,408,393 fine ounces, or 418,000 ounces less than in 1925. The silver used in the photographic and chemical industries was about 7,000,000 ounces, an increase of 1,000,000 ounces over 1925. In addition to the gold and silver derived from foreign and domestic ore and bullion, $25,039,153 in gold and 6,487,677 fine ounces of silver were recovered from old jewelry, dental waste, silverware, and other old material; of this, $10,831,504 in gold and 5,567,720 ounces of silver were handled by private refineries.

PRICES OF SILVER

The average monthly prices of fine bar silver in New York in 1926 were as follows:

Price of silver per fine ounce in 1926, by months

January	$0.68107	August	$0.62699
February	.67108	September	.60895
March	.66223	October	.54817
April	.64760	November	.54458
May	.65389	December	.53778
June	.65798		
July	.65106	Average	.62428

The yearly price of silver trended downward, steadily in the main, from $1.337 and $1.339 in 1865 and 1866 to a low point of $0.507 in 1915. After that date the trend was upward until 1923.

Price of silver per fine ounce, 1917–1926 [1]

1917	$0.824	1922	$1.00
1918	.980	1923	.82
1919	1.12	1924	.67
1920	1.09	1925	.694
1921	1.00	1926	.624

To forecast prices of silver during 1928 is impossible because of the continuing chaos in China and because there is no way of estimating the quantity of silver needed to meet the demands of India. There is no present indication of a large increase in the demand for silver for coinage.

PRODUCTION OF GOLD AND SILVER SINCE 1792

Gold and silver produced in the United States, 1792–1926

[The estimate for 1792–1872 is by R. W. Raymond, commissioner, and for the period since 1872 by the Director of the Mint]

Period	Gold		Silver	
	Fine ounces	Value	Fine ounces	Commercial value
1792–1847 [1]	1,186,977	$24,537,000	309,500	$404,500
1848–1872	58,279,781	1,204,750,000	118,568,200	157,749,900
1873–1926	153,089,707	3,164,645,100	2,817,422,911	2,225,978,539
	212,556,465	4,393,932,100	2,936,300,611	2,384,132,939

[1] A careful investigation made by Philip B. Bekeart (Soc. California Pioneers Quarterly, Sept. 30, 1924) appears to have definitely fixed Jan. 19, 1848, as the date of the discovery of gold by James W. Marshall at Sutters Mill, Coloma, Eldorado County, Calif., and to have shown that the flakes (not a nugget) found by Marshall are now in the National Museum, Washington, D. C.

Although the output of gold during the period 1792–1926 was less than one-fourteenth the output of silver in quantity, the value of the gold was $2,000,000,000 more than that of the silver.

The average commercial value per fine ounce of silver for the 134 years contributing to the total domestic production was $0.8120.

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[1] New York dealers' buying price for 1917–1919; average buying price of silver from domestic mines for 1920 to June 2, 1923; average New York price for all silver after that period.

IMPORTS AND EXPORTS [2]

Value of gold and silver imported into and exported from the United States, 1925–26, by classes

	Imports	Exports	Excess of—	
			Imports	Exports
1925				
Gold:				
Contained in domestic ore and base bullion		$144,480		$144,480
Contained in foreign ore and base bullion	$16,205,097		$16,205,097	
Domestic bullion refined	5,041,364	105,995,453		100,954,089
Foreign bullion refined	91,893,425	360	91,893,065	
United States coin	11,210,631	156,123,273		144,912,642
Foreign coin	3,922,655	376,224	3,546,431	
	128,273,172	262,639,790	111,644,593	246,011,211
Excess exports over imports				134,366,618
Silver:				
Contained in domestic ore and base bullion		33,250		33,250
Contained in foreign ore and base bullion	33,134,911		33,134,911	
Domestic bullion refined		81,451,173		81,451,173
Foreign bullion refined	29,899,214	13,157,833	16,741,381	
United States coin	999,100	318,235	680,865	
Foreign coin	562,193	4,167,094		3,604,901
	64,595,418	99,127,585	50,557,157	85,089,324
Excess exports over imports				34,532,167
1926				
Gold:				
Contained in domestic ore and base bullion		207,725		207,725
Contained in foreign ore and base bullion	20,872,276		20,872,276	
Domestic bullion refined	874,633	9,536,867		8,662,234
Foreign bullion refined	71,130,166	1,281	71,128,885	
United States coin	53,971,385	104,349,771		50,378,386
Foreign coin	66,655,560	1,612,171	65,043,389	
	213,504,020	115,707,815	157,044,550	59,248,345
Excess imports over exports			97,796,205	
Silver:				
Contained in domestic ore and base bullion		53,573		53,573
Contained in foreign ore and base bullion	46,170,162	381	46,169,781	
Domestic bullion refined		73,961,544		73,961,544
Foreign bullion refined	21,098,685	14,581,915	6,516,770	
United States coin	1,559,943	542,470	1,017,473	
Foreign coin	767,146	3,117,681		2,350,535
	69,595,936	92,257,564	53,704,024	76,365,652
Excess exports over imports				22,661,628

DOMESTIC SUPPLY

The remarkable gain in the domestic supply of gold, indicated by the great excess of $530,000,000 in imports over exports in 1916, of $180,000,000 in 1917, and of $21,000,000 in 1918, had come to a halt in the early part of 1919 but was resumed in 1920. This excess was $667,000,000 in 1921, $238,000,000 in 1922, $294,000,000 in 1923, and $258,000,000 in 1924. The exports of gold in 1925 exceeded the imports by $134,000,000, because of large exports to the Orient, mainly India. In 1926 the inflow of gold was resumed, and the imports exceeded the exports by nearly $98,000,000. The great bulk of the gold exported in 1926 was gold coin which went to Germany and Canada.

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[2] Figures on imports and exports compiled by J. A. Dorsey, of the Bureau of Mines, from records of the Bureau of Foreign and Domestic Commerce.

The domestic supply of new gold comes chiefly from dry and siliceous ore and from placer gravel worked largely by dredges. As shown on page 696, this ore and the placer gravel supplied 78.5 per cent of the yield of gold in 1926, compared with 80.2 per cent in 1925. Considerable gold is usually recovered also from the refining of copper bullion from copper ore, especially in the West Mountain or Bingham district, Utah, and the Summit Valley or Butte district, Mont.

In 1926 the copper ore of the United States yielded 16.36 per cent of the total gold, compared with 2.25 per cent in 1921, 5.71 per cent in 1922, 11.3 per cent in 1923, 12.7 per cent in 1924, and 15.08 per cent in 1925. The natural tendency has been for the proportionate output from gold ore to decrease with declining yield from some of the principal gold camps, and for that from copper ore to increase, with a general net decline of total yield of gold owing to the preponderant output from gold and gold-silver ores.

In 1926 the chief domestic supply of new silver came from copper ore, lead ore, lead-zinc ore, and dry and siliceous silver and silver-gold ores, in the proportion of 27.27, 24.85, 23.32, and 21.71 per cent, respectively, compared with 27.06, 28.15, 17.36, and 25.63 per cent in 1925. The greater part of the dry and siliceous silver ore is milled and cyanided at or near the mines, but a small quantity of richer ore is shipped to copper and lead smelters.

WORLD'S PRODUCTION OF GOLD

The estimated value of the gold produced in the world from 1860 to 1926, inclusive, was $15,877,897,800. In 1926 the estimated production of the world was $398,664,700, an increase of about $5,406,000 over that of 1925. This increase followed a period of successive annual decreases from 1915 to 1922, increases of $48,433,300 in 1923 and of $25,607,400 in 1924, and a decrease of $202,400 in 1925. The production in 1926 in the United States decreased $1,590,600. The production in Canada increased $382,300. Most of the increased output of gold has been due to larger production at the Rand mines in South Africa and at mines in Canada. Of the total of about 982,520,000 ounces of gold produced by the world since the earliest records, the Union of South Africa has furnished about 21 per cent and the United States nearly 22 per cent. The general opinion of prominent geologists and engineers is that the present relatively subordinate position of the United States as a producer of gold will be permanent, although the future annual output may slightly increase in certain years. On the whole, however, the output is more likely to decrease over a period of years. In the following table is shown the output of gold by countries, as given by the Bureau of the Mint with slight changes resulting from late information.

World's production of gold, 1921–1926

Country	1921	1922	1923	1924	1925	1926
North America:						
Canada	$19,148,900	$26,116,000	$25,495,400	$31,532,400	$35,880,800	$36,263,100
Central America	2,500,000	2,500,000	2,000,000	1,800,000	2,000,000	1,800,000
Mexico	14,152,600	15,469,200	16,158,400	16,480,100	16,309,900	15,972,300
United States [1]	50,067,300	48,849,100	51,734,000	52,277,000	49,860,200	48,269,600
South America:						
Argentina	75,000	75,000	80,000	60,000	55,000	50,000
Bolivia	6,000	8,400	8,400	19,900	8,000	6,900
Brazil	2,780,000	3,031,900	2,990,700	2,990,700	2,243,000	2,110,800
Chile	933,100	1,650,200	1,331,200	1,400,000	1,265,500	1,222,400
Colombia	6,000,000	5,700,000	5,700,000	2,000,000	1,582,400	1,560,500
Ecuador	749,500	877,600	877,600	800,000	900,000	1,291,700
Guiana—						
British	265,200	224,800	168,900	131,000	188,300	134,700
Dutch	233,300	247,900	263,200	214,000	204,700	155,600
French	1,000,000	1,008,200	922,500	1,312,600	831,400	877,300
Peru	1,599,700	1,683,400	2,488,300	2,459,000	2,433,800	1,933,900
Uruguay	7,000	7,000	200	200	----------	----------
Venezuela	625,400	358,900	358,900	358,900	631,400	631,300
Europe:						
Austria	3,300	11,300	15,300	40,500	38,500	27,200
Czechoslovakia	235,900	171,400	69,100	186,100	156,800	159,500
France	49,100	332,300	350,200	409,400	701,800	731,100
Germany	86,400	112,300	132,900	132,900	120,900	107,600
Greece	----------	8,600	8,600	8,000	----------	----------
Italy	----------	----------	25,200	31,900	39,900	35,200
Rumania	856,000	888,500	996,900	871,300	827,400	839,400
Russia and Siberia	892,600	3,032,600	5,181,900	19,805,100	20,364,900	20,509,700
Spain	----------	18,700	18,700	20,000	20,000	20,000
Sweden	1,300	700	----------	----------	----------	----------
Turkey	----------	29,900	29,900	19,300	19,300	19,900
Yugoslavia	82,400	143,500	126,900	161,500	156,800	214,700
Asia:						
China	2,067,200	2,067,200	1,850,100	2,218,100	2,218,100	2,273,900
Chosen	2,705,800	2,643,800	2,510,200	2,772,700	3,035,100	3,940,500
East Indies—						
British	500,000	600,000	600,000	500,000	500,000	400,000
Dutch	1,946,600	2,156,000	2,388,600	2,571,300	2,743,500	2,384,600
Federated Malay States	276,700	310,200	190,000	309,200	292,400	299,200
India, British	8,945,200	9,054,600	8,729,900	8,193,200	8,140,700	7,937,400
Indo-China	3,300	99,700	128,300	7,200	7,200	6,600
Japan	4,901,400	4,833,300	5,111,700	5,054,300	6,557,800	6,364,100
Sarawak	353,300	22,700	20,800	17,700	14,700	5,000
Taiwan	588,200	453,900	453,900	178,800	186,800	186,800
Africa	186,968,400	165,774,100	209,954,000	219,579,700	218,759,600	226,413,300
Australasia	18,672,700	18,847,200	18,382,600	16,536,800	13,961,800	13,508,900
	330,278,800	319,420,100	367,853,400	393,460,800	[2] 393,258,400	[3] 398,664,700

[1] Includes Philippine Islands.
[2] Revised figures.
[3] Revised figures will be given in the report for 1927.

WORLD'S PRODUCTION OF SILVER

The figures for the world's production of silver in 1926 show that the United States and Canada produced 34 per cent of the total (35 per cent in 1925), that Mexico, Central America, and South America produced 52 per cent, and that all other countries—mainly Australasia, Germany, Burma, Japan, Spain, and Dutch East Indies—produced only 14 per cent (36,367,600 ounces). The increase in the world's production in 1926 was 8,395,000 ounces; the largest increases were: Mexico, 5,405,700 ounces; Canada, 2,142,900 ounces; Peru, 1,582,400 ounces; and Bolivia, 1,487,500 ounces. The average monthly open-market price in 1926 ranged from $0.68107 per ounce for January to $0.53778 for December. The value of the silver produced in the world in 1926, at $0.62873 a fine ounce, was $159,438,900; the total value from 1860 to 1926, inclusive, was $6,892,447,500.

Most of the world's output of silver is produced or refined in the United States, but a large part of it is consumed in Great Britain, Germany, India, and China; the price of silver has been dominated by the London market.

World's production of silver, 1921–1926, in fine ounces

Country	1921	1922	1923	1924	1925	1926
North America:						
Canada	13, 134, 900	18, 581, 400	17, 754, 700	19, 736, 300	20, 229, 000	22, 371, 900
Central America	2, 000, 000	2, 000, 000	2, 500, 000	2, 686, 200	2, 700, 900	3, 499, 100
Mexico	64, 465, 400	81, 076, 900	90, 859, 100	91, 486, 100	92, 885, 500	98, 291, 200
United States[1]	53, 052, 400	56, 240, 100	73, 335, 200	65, 407, 200	66, 155, 400	62, 718, 700
South America:						
Argentina	25, 000	25, 000	--------------	20, 000	18, 000	15, 000
Bolivia	2, 758, 900	5, 373, 500	5, 212, 800	4, 857, 660	4, 346, 500	5, 834, 000
Brazil	33, 000	25, 700	28, 600	28, 600	1, 800	20, 700
Chile	2, 200, 000	2, 709, 200	3, 337, 500	3, 357, 700	3, 261, 700	2, 876, 900
Colombia	500, 000	3, 200	3, 100	2, 900	2, 900	2, 800
Ecuador	75, 000	75, 000	75, 000	70, 000	70, 000	80, 000
Guiana	9, 000	9, 000	8, 500	8, 700	8, 500	8, 000
Peru	10, 008, 600	13, 169, 800	18, 654, 800	18, 717, 100	19, 917, 400	21, 499, 800
Uruguay	2, 000	2, 000	--------------	--------------	--------------	--------------
Venezuela	2, 700	2, 700	2, 700	2, 700	3, 200	3, 200
Europe:						
Austria	10, 500	8, 600	14, 200	28, 700	23, 900	14, 100
Czechoslovakia	703, 100	875, 200	702, 300	732, 500	707, 300	765, 500
France	321, 500	209, 000	213, 000	147, 900	352, 000	401, 900
Germany	3, 387, 400	3, 581, 500	3, 753, 000	3, 753, 000	4, 780, 400	5, 358, 900
Great Britain	11, 300	27, 600	34, 600	31, 100	32, 400	41, 300
Greece	--------------	184, 100	184, 100	160, 700	254, 300	254, 300
Italy	199, 300	204, 700	385, 800	497, 000	320, 800	519, 400
Norway	196, 100	205, 200	297, 900	424, 400	504, 700	335, 900
Poland	--------------	--------------	--------------	192, 900	212, 200	271, 700
Rumania	96, 500	83, 300	84, 800	72, 200	76, 600	15, 400
Russia	40, 000	150, 000	192, 900	250, 000	250, 000	250, 000
Spain	2, 679, 400	2, 778, 200	2, 778, 200	2, 880, 000	3, 303, 900	3, 000, 700
Sweden	13, 300	--------------	600	--------------	--------------	--------------
Turkey	100, 000	8, 000	8, 000	219, 900	219, 900	225, 000
Yugoslavia	15, 900	26, 800	24, 600	31, 200	26, 100	45, 000
Asia:						
Burma	3, 437, 600	4, 094, 300	4, 713, 100	5, 284, 200	4, 831, 500	5, 100, 000
China	40, 000	100, 000	100, 000	110, 000	110, 000	135, 000
Chosen	3, 000	10, 700	39, 300	54, 700	70, 200	51, 900
East Indies, Dutch	1, 022, 000	1, 109, 600	1, 579, 000	2, 083, 300	2, 385, 000	2, 363, 800
India, British	150, 000	150, 000	150, 000	25, 000	23, 400	25, 000
Japan	4, 187, 700	3, 886, 300	3, 597, 400	3, 542, 300	4, 835, 500	4, 776, 100
Sarawak	3, 400	500	--------------	--------------	--------------	--------------
Taiwan	26, 500	23, 400	23, 400	11, 000	13, 200	14, 300
Africa:						
Algeria	--------------	--------------	--------------	--------------	96, 500	100, 900
Bechuanaland	--------------	--------------	--------------	--------------	500	400
Belgian Congo	5, 800	6, 500	8, 700	--------------	--------------	--------------
British West Africa (Gold Coast, Ashanti, Nigeria)	--------------	--------------	70	--------------	--------------	--------------
East Africa, French	12, 900	12, 900	--------------	--------------	--------------	--------------
East Africa, Portuguese	500	500	--------------	--------------	1, 300	1, 100
Rhodesia	161, 900	184, 400	161, 500	401, 300	158, 000	117, 800
Tanganyika	--------------	--------------	--------------	700	1, 000	800
Transvaal, Cape Colony, Natal	830, 800	1, 115, 700	1, 373, 900	1, 396, 900	1, 161, 500	981, 300
Australasia	5, 362, 200	11, 484, 900	13, 818, 700	10, 769, 900	10, 841, 000	11, 200, 100
	171, 285, 500	209, 815, 400	246, 011, 070	239, 481, 900	[2] 245,193,900	[3] 253,588,900

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[1] Includes Philippine Islands.
[2] Revised figures.
[3] Revised figures will be given in the report for 1927.

The exports of silver in 1926 were much less than in 1925. Exports of domestic refined silver bullion amounted to 118,239,000 ounces, of which 52,005,800 went to China and 53,590,400 to British India and Malaya. Germany and the United Kingdom took a little more than 11,000,000 ounces. These figures show that the Orient continues to absorb the silver refined in the United States. The Indian Government has been selling some silver, but European authorities believe that silver will not be sold in large enough quantities to affect the price, as depreciation of the nation's savings which are mainly in silver would be politically unwise. The Indian populace will continue to buy silver so long as relative prosperity continues, and if the country remains prosperous the holdings of the Government will be brought down to the amount desired in the fiscal program planned for the coming decade. Thus a good market for foreign purchases will be maintained.

MINE REPORT

METHOD OF COLLECTING STATISTICS

The first table in this report presents the final official figures of the production of gold and silver in the United States in 1926 as agreed upon by the Bureau of the Mint and the Bureau of Mines. With the comparatively unimportant exceptions of domestic gold and silver contained in ore and matte exported for reduction during the year, these figures record the production of gold and silver bullion from domestic ore in marketable form as metals, either refined or unrefined.

To trace this total gold and silver produced back to its source by States, counties, and mining districts, the Bureau of Mines makes a systematic investigation of the "mine production" of ores containing gold and silver and of the output of the placer mines, the output being classified by methods of production and by kinds of ore, as well as by mining districts. The resulting figures form the basis of the mine reports.

Of the two plans for ascertaining the gold and silver production, one is a measure of the metallurgic industry and the other a measure of the mining industry; one reports the metal actually recovered in marketable form and the other the mine output and its recoverable content. The two methods will not produce exactly corresponding results, but the figures for a period of years sufficiently long to compensate for overlap or lag should agree within allowable limits of error.

Gold and silver produced in the United States, 1905–1926, according to mint and to mine returns

Year	Mint		Mine	
	Gold	Silver	Gold	Silver
		Ounces		*Ounces*
1905–1916	$1, 130, 876, 400	746, 233, 077	$1, 124, 192, 122	751, 155, 738
1917	83, 750, 700	71, 740, 362	82, 032, 745	70, 665, 531
1918	68, 646, 700	67, 810, 139	67, 701, 936	68, 063, 090
1919	60, 333, 400	56, 682, 445	58, 225, 112	51, 907, 869
1920	51, 186, 900	55, 361, 573	50, 537, 281	56, 559, 022
1921	50, 067, 300	53, 052, 441	49, 788, 750	46, 359, 147
1922	48, 849, 100	56, 240, 048	48, 932, 109	61, 235, 983
1923	51, 734, 000	73, 335, 170	51, 400, 382	70, 393, 639
1924	52, 277, 000	65, 407, 186	52, 180, 812	64, 113, 882
1925	49, 860, 200	66, 155, 424	49, 645, 444	66, 776, 275
1926	48, 269, 600	62, 718, 746	48, 075, 596	62, 533, 373
	1, 695, 851, 300	1, 374, 736, 611	1, 682, 712, 289	1, 369, 763, 549

These figures show, according to the reports of the mint, a total excess of gold for the 22 years of $13,139,011, or a difference of 0.8 per cent, and a total excess of silver of 4,973,062 ounces, or a difference of 0.36 per cent. The small differences are fully accounted for in the detailed discussions of the subject in previous reports of this series.

UNITS OF MEASUREMENT

In the measurement of ores and concentrates the short ton of 2,000 pounds is used throughout. The price of gold is fixed by law at $20.67 + per fine ounce. The annual average prices for silver from 1917 to 1926 are given on page 675.

PRODUCTION OF GOLD AND SILVER REPORTED FROM THE MINES

Mine production of gold and silver in the United States in 1926, by States

State or Territory	Gold		Silver		Increase or decrease from 1925	
	Fine ounces	Value	Fine ounces	Value	Gold	Silver (fine ounces)
Alaska	324, 451. 13	$6, 707, 000	690, 000	$430, 560	+$346, 719	−8, 259
Arizona	234, 010. 97	4, 837, 436	7, 381, 027	4, 605, 761	+667, 081	+123, 159
Arkansas	-----	-----	-----	-----	-----	−3, 118
California	576, 798. 40	11, 923, 481	2, 022, 460	1, 262, 015	−1, 141, 849	−1, 031, 956
Colorado	342, 399. 84	7, 078, 033	4, 704, 122	2, 935, 372	−148, 989	+197, 182
Georgia	148. 71	3, 074	9	5	−6, 609	−37
Idaho	13, 669. 27	282, 569	7, 556, 444	4, 715, 221	−149, 202	−186, 995
Illinois	-----	-----	2, 990	1, 866	-----	−10
Michigan	-----	-----	105, 242	65, 671	-----	−34, 257
Missouri	-----	-----	90, 000	56, 160	-----	+6, 660
Montana	60, 504. 11	1, 250, 731	12, 769, 092	7, 967, 913	−446, 899	−389, 099
Nevada	175, 381. 68	3, 625, 461	6, 518, 983	4, 067, 845	−242, 337	−577, 635
New Mexico	19, 630. 72	405, 803	450, 934	281, 383	−143, 270	−284, 190
North Carolina	78. 90	1, 631	21	13	−16, 909	−87
Oregon	13, 243. 10	273, 759	29, 733	18, 553	−118, 650	−3, 060
Pennsylvania	21. 77	450	544	339	−4, 450	−2, 576
Philippine Islands	93, 130. 97	1, 925, 188	46, 154	28, 800	−20, 802	−19, 846
Porto Rico	-----	-----	-----	-----	−1, 800	−195
South Carolina	15. 14	313	-----	-----	+313	-----
South Dakota	279, 528. 93	5, 778, 376	82, 186	51, 284	−211, 228	−13, 947
Tennessee	417. 09	8, 622	104, 000	64, 896	+1, 201	+1, 051
Texas	109. 81	2, 270	447, 237	279, 076	+2, 270	−104, 763
Utah	182, 762. 98	3, 778, 046	19, 358, 581	12, 079, 755	+102, 530	−1, 918, 108
Vermont	1. 98	41	1, 965	1, 227	+41	+1, 965
Virginia	10. 64	220	-----	-----	+152	−5
Washington	9, 340. 82	193, 092	171, 649	107, 109	−37, 161	+5, 224
	2, 325, 656. 96	48, 075, 596	62, 533, 373	39, 020, 824	−1, 569, 848	−4, 242, 902

The preceding table gives the quantity and value of the gold and silver ("mine production"), by States, reported from the producing mines in 1926 to the Bureau of Mines and the increase or decrease by comparison with the corresponding figures for 1925.

The principal gold-producing States in 1926 were California, Colorado, Alaska, South Dakota, Arizona, Utah, and Nevada, and these seven States made 91 per cent of the total output. The notable increases in gold were in Alaska, Arizona, and Utah. The most notable decreases in gold were in California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, South Dakota, and Washington.

The principal silver-producing States in 1926 were Utah, Montana, Idaho, Arizona, Nevada, Colorado, and California, and these seven States produced 96 per cent of the total.

About $28,700,000 in gold, or 60 per cent of the entire output in the United States in 1926, was produced by 25 companies, none of which produced less than $378,000. The largest producer was the celebrated Homestake mine, in South Dakota. Sixteen of these large properties produced gold from dry and siliceous ore, three produced it from gravel by dredging, two from copper ore, one from copper ore and siliceous ore, one from copper ore and zinc ore, one from copper ore and lead ore, and one from copper ore and lead-zinc ore. Nine were in California, five in Colorado, four in Arizona, two each in Alaska and Nevada, and one each in Montana, South Dakota, and Utah.

Larger producers of gold in the United States in 1926, in order of output

Rank	Operator	State	Mining district	Source of gold
1	Homestake Mining Co	South Dakota	Whitewood	Dry and siliceous ore.
2	Yuba Consolidated Goldfields	California	Marysville	Dredging gravel.
3	Alaska Juneau Gold Mining Co	Alaska	Juneau	Dry and siliceous ore.
4	Cresson Consolidated Gold Mining & Milling Co.	Colorado	Cripple Creek	Do.
5	Utah Copper Co	Utah	West Mountain	Copper ore and lead-zinc ore.
6	Portland Gold Mining Co	Colorado	Cripple Creek	Dry and siliceous ore.
7	Natomas Co. of California	California	Oroville and Folsom	Dredging gravel.
8	Hammon Consolidated Gold Fields.	Alaska	Nome	Do.
9	Empire Mines Co	California	Grass Valley	Dry and siliceous ore.
10	United Verde Copper Co	Arizona	Verde	Copper ore and siliceous ore.
11	Comstock Merger Mines (Inc.)	Nevada	Comstock	Dry and siliceous ore.
12	Smuggler Union Mining Co	Colorado	Upper San Miguel	Do.
13	Kennedy Mining & Milling Co	California	Jackson	Do.
14	North Star Mines Co	do	Grass Valley	Do.
15	United Gold Mines	Colorado	Cripple Creek	Do.
16	Phelps Dodge Corporation (Copper Queen).	Arizona	Warren	Copper ore and lead ore.
17	Nevada Consolidated Copper Co	Nevada	Robinson	Copper ore.
18	Central Eureka Mining Co	California	Mother Lode	Dry and siliceous ore.
19	Anaconda Copper Mining Co	Montana	Summit Valley (Butte).	Mainly copper ore and zinc ore.
20	Argonaut Mining Co	California	Jackson	Dry and siliceous ore.
21	Calumet & Arizona Mining Co	Arizona	Warren	Copper ore.
22	Carson Hill Gold Mines (Inc.)	California	Mother Lode	Dry and siliceous ore.
23	Original Sixteen to One Mines Co	do	Alleghany	Do.
24	Tomboy Gold Mines Co	Colorado	Upper San Miguel	Do.
25	Katherine Gold Mining Co	Arizona	Union Pass	Do.

Besides the output of gold by these large operators, $17,450,000 came from about 3,600 placer and lode mines, not including those of the Philippine Islands, many of which produced between $100,000 and $300,000 each. Hundreds of mines, especially placer properties in California, Oregon, Idaho, Alaska, and Montana, produced very small quantities of gold, and the average value of output of the smaller mines was about $5,400.

The Benguet Consolidated Mining Co., Philippine Islands, according to its printed report, produced about $1,450,000 in gold in 1926. (See p. 689.) Only six companies in the United States exceeded that output.

The largest output of silver was that of the mines operated by the Anaconda Copper Mining Co., followed by the Park Utah Consolidated Mines Co. and the Tintic Standard Mining Co. Of the mines enumerated in the subjoined list, 2 recovered silver from dry and siliceous ore; 3 from lead ore; 5 from copper ore; 5 from copper, copper-lead, lead, or lead-zinc ore; 6 from siliceous and lead or lead-zinc ore; 2 from lead and lead-zinc ore; 1 from lead-zinc ore; and 1 from lead, copper, and siliceous ore. The California Rand mine, in California, and the Presidio mine, in Texas, were the largest producers of silver from ore that contained no appreciable quantity of any other metal. The output of the 25 properties listed was 39,277,300 ounces, or 63 per cent of the United States total. Eleven of the largest producers were in Utah, 4 in Arizona, 3 each in Montana and Idaho, 2 in Nevada, and 1 each in Colorado and California. None of the 25 companies produced less than 635,000 ounces in 1926.

Larger producers of silver in the United States in 1926, in order of output

Rank	Operator	State	Mining district	Source of silver
1	Anaconda Copper Mining Co.	Montana	Summit Valley (Butte).	Copper ore and lead-zinc ore.
2	Park Utah Consolidated Mines Co.	Utah	Blue Ledge	Siliceous ore, lead-zinc ore, and lead ore.
3	Tintic Standard Mining Co.	do	Tintic	Lead ore, siliceous ore, and copper ore.
4	United Verde Copper Co.	Arizona	Verde	Copper ore.
5	Butte & Superior Mining Co.	Montana	Summit Valley	Copper ore and lead zinc ore.
6	Silver King Coalition Mines Co.	Utah	Uintah	Lead ore and lead-zinc ore.
7	Federal Mining & Smelting Co.	Idaho	Hunter and Warm Springs.	Do.
8	Hecla Mining Co.	do	Lelande	Lead ore.
9	Bunker Hill & Sullivan Mining & Concentrating Co.	do	Yreka	Do.
10	Chief Consolidated Mining Co.	Utah	Tintic	Lead ore, siliceous ore, and lead-zinc ore.
11	Comstock Merger Mines (Inc.)	Nevada	Comstock	Dry and siliceous ore.
12	Plutus Mining Co.	Utah	Tintic	Dry and siliceous ore and lead ore.
13	United States Smelting, Refining & Mining Co.	do	West Mountain	Lead ore, lead-zinc ore, and copper ore.
14	California Rand Silver (Inc.)	California	Randsburg	Dry and siliceous ore.
15	Utah Copper Co.	Utah	West Mountain	Copper ore.
16	Sunnyside Mining & Milling Co.	Colorado	Eureka	Lead-zinc ore.
17	Magma Copper Co.	Arizona	Pioneer	Copper ore.
18	Mammoth Mining Co.	Utah	Tintic	Dry and siliceous ore and lead ore.
19	Calumet & Arizona Mining Co.	Arizona	Warren	Copper ore.
20	Ontario Silver Mining Co.	Utah	Uintah	Dry and siliceous ore and lead-zinc ore.
21	Utah-Apex Mining Co.	do	Bingham	Copper ore, lead ore, and lead-zinc ore.
22	Betty O'Neal Mines Co.	Nevada	Lewis	Lead ore.
23	Phelps Dodge Corporation	Arizona	Warren	Copper ore.
24	Silver Dyke Mining Co.	Montana	Montana	Lead ore and copper-lead ore.
25	Bingham Mines Co.	Utah	Tintic and West Mountain.	Dry and siliceous ore, lead ore, and lead-zinc ore.

MINE PRODUCTION OF GOLD AND SILVER, BY STATES

ALASKA

Gold.—The yield of gold from siliceous ore decreased from $3,101,715 in 1925 to $2,898,000 in 1926, and that from copper ore and lead ore increased from $35,566 to $40,000; the placer output increased from $3,223,000 to $3,769,000. Thirty-two dredges produced $2,291,000 of the placer gold; this was $718,688 more than the dredge output in 1925.

The 3,924,925 tons of siliceous ore treated in 1926 yielded an average of $0.75 in gold and silver to the ton, and the 670,427 tons of copper ore and lead ore yielded $0.62 in gold and silver to the ton.

About 43 per cent of the total output of gold in Alaska in 1926 came from gold-lode mines, compared with 49 per cent in 1925. Dredges handled 5,730,000 cubic yards of auriferous gravel in 1926 and made an average recovery of 40 cents a cubic yard, compared with 50 cents in 1925. The estimated total recovery of gold by dredging for the period 1903 to 1926 is $32,150,474.

Silver.—The mine production of silver in Alaska in 1926 was 690,000 fine ounces, compared with 698,259 ounces in 1925. In 1926 copper ore yielded 597,818 ounces, siliceous ore 59,940 ounces, placers 24,870 ounces, and lead ore 7,372 ounces.

ARIZONA

Gold.—Of the mine production of gold in Arizona in 1926, placers contributed only $7,007. The lode mines produced $4,830,429, of which 21.7 per cent came from dry and siliceous ore, mainly from Mohave, Cochise, and Yavapai Counties, and 71.8 per cent from copper ore, mainly from Yavapai, Cochise, and Pima Counties. Cochise County had a gold output of $1,564,647, Yavapai County $1,496,546, and Mohave County $838,429. The gold recovered from ore treated at gold and silver mills in 1926 represented 17 per cent of the total lode-mine output, compared with 14.5 per cent from ore and old tailings in 1925; crude ore shipped to smelters yielded 59 per cent. The crude copper ore mined and smelted direct (without previous concentration) yielded an average of about 88 cents in gold a ton.

Silver.—Of the mine production of silver in Arizona, 5,984,415 ounces came from copper ore, 716,945 ounces from lead ore, 460,826 ounces from dry and siliceous ore, and 145,989 ounces from copper-lead ore. Yavapai County produced 2,770,949 ounces in 1926, mainly from copper ore, and Cochise County produced 2,299,600 ounces, of which 1,528,377 ounces came from copper ore and 567,415 ounces from lead ore. Bullion recovered from gold and silver ores, almost all by cyanidation, yielded 51,040 ounces of silver, concentrates yielded 1,943,130 ounces, and crude ore shipped to smelters 5,292,662 ounces.

ARKANSAS, MISSOURI, OKLAHOMA, ILLINOIS, AND KENTUCKY

The lead and zinc mines of the Central States produce no gold and only a small quantity of silver. Nearly all the silver has been a by-product from the refining of lead from concentrates of lead ores mined in southeastern Missouri. All the silver from Missouri in 1926 was derived from lead recovered from about 100,000 tons of galena concentrates produced in southeastern Missouri and from zinc concentrates recovered from lead ores. The zinc concentrates were shipped to zinc smelters, and the residues containing the silver were shipped to lead smelters. Lead concentrates from the Joplin region contain about one-tenth ounce of silver a ton which is not recovered. The lead-zinc-fluorspar deposits of the Kentucky-Illinois field carry silver, and the average silver recovery from lead concentrates from Illinois in 1926 was 4.87 ounces to the ton. No silver ore has been shipped from the Criswell mine, near Byars, McClain County, Okla., since 1916.

CALIFORNIA

Gold.—In 1926 the lode mines of California produced $6,695,078 in gold (a decrease of $1,274,108), of which gold-quartz yielded 94.6 per cent, and the placers produced $5,228,403 (an increase of $132,259).

Of the placer production, $4,950,545 was recovered by dredging. The total dredge production from 1896 to the end of 1926 was $150,071,842, and the production by dredges in 1926 was equal to 41.5 per cent of the total output of gold for the year. The seven Yuba County dredges made the largest output, its value being $2,761,716, an increase of $201,051. Six dredges in Sacramento County made an output of $1,303,465, an increase of $2,979. In Butte County, including Oroville and other districts, two dredges produced $209,441, or $26,113 less than in 1925. Dredges were also operated in Calaveras, Placer, Shasta, Stanislaus, and Trinity Counties.

Four of the 34 counties reporting mine production of gold had a yield of more than $1,000,000 each in 1926. Of these Yuba and Sacramento Counties obtained most of their gold by dredging, Amador County is on the Mother Lode, and Nevada County produced gold mainly from siliceous ore of the Grass Valley district. The five Mother Lode counties—Amador, Calaveras, Eldorado, Mariposa, and Tuolumne—whose output is mainly gold milling ore, produced $2,508,724 in gold from mill bullion and $521,157 from concentrates made from gold ore in 1926, compared with $2,445,258 from mill bullion and $670,988 from concentrates in 1925.

Silver.—Of the mine production of silver in California in 1926, siliceous ore yielded 1,252,514 ounces, copper ore 397,174 ounces, lead ore 128,027 ounces, zinc ore 150,053 ounces, lead-zinc ore 70,308 ounces, copper-lead ore 5,022 ounces, and placers 19,362 ounces. The only counties producing more than 100,000 ounces of silver in 1926 were Inyo, Mono, Plumas, San Bernardino, and Shasta. Sixty-seven per cent of the silver was recovered from ore sent to concentrating plants.

COLORADO

Gold.—The total mine production of gold in Colorado in 1926 showed a large decrease from 1925. The Cripple Creek district, with a decrease of $172,592, produced $4,436,012 in gold, or 63 per cent of the State output; the San Juan region, in Dolores, La Plata, Ouray, San Juan, and San Miguel Counties, produced $1,710,252; Lake County produced $469,678, an increase of $25,693. Siliceous and dry ores, forming 67.4 per cent of all the ore sold or treated in Colorado in 1926, yielded 93.7 per cent of the State output of gold, lead-zinc ore 4.8 per cent, placers less than 1 per cent, and other classes of ore the remainder. The gold recovered by amalgamation from 757,783 tons of ore amounted to 95,055 fine ounces and that recovered by cyanidation to 151,572 fine ounces.

The placer production in 1926 was 2,271 ounces (a decrease of 5,000 ounces from 1925); dredges in Summit and Lake Counties produced 83 per cent of this total.

Silver.—Lake County, mainly Leadville, produced 714,585 ounces of silver, a decrease of 177,550 ounces from 1925. San Miguel County produced 1,206,277 ounces, an increase of 130,722 ounces. San Juan County produced 869,963 ounces, Mineral County 551,468 ounces, Saguache County 289,505 ounces, Clear Creek County 272,492 ounces, and Pitkin County 242,290 ounces. Siliceous and dry ores yielded 59.5 per cent of the silver recovered, lead-zinc ore 26.2 per cent, and lead ore 13.3 per cent.

IDAHO

Gold.—The total production of gold in Idaho from the discovery of placer gold in 1863 to the end of 1926 is estimated by C. N. Gerry at $135,898,039. In 1926 Boise County produced 29 per cent, Elmore County 26 per cent, and Shoshone County 25 per cent of the State total. The lode mines produced $109,743 in gold, and the placers $172,826, of which $141,160 was won by dredging. The total output of gold recovered by dredges from 1897 to the end of 1926 was $5,779,398. Of the total gold in 1926, 61 per cent came from placers, 22 per cent from siliceous ore, 10.6 per cent from lead ore, and the remainder from copper, lead-zinc, and copper-lead ores.

Silver.—The total mine production of silver in Idaho for the period 1863 to 1926, inclusive, amounted to 289,713,237 fine ounces. Shoshone County produced 92 per cent of the State output in 1926, compared with 86.5 per cent in 1925. Lead ore yielded 60.6 per cent of the silver, lead-zinc ore 27.5 per cent, copper-lead ore 5.9 per cent, and copper ore 5.7 per cent. Crude ore shipped to smelters, which yielded on the average 18.79 ounces of silver to the ton, supplied 18.7 per cent of the silver, and concentrates, which yielded 20.91 ounces of silver to the ton, supplied 81 per cent.

MICHIGAN

The copper mines of Michigan produced 105,242 ounces of silver in 1926, mainly from the electrolytic treatment of about 2,500,513 pounds of copper.

MONTANA

Gold.—The placer output of gold in Montana in 1926 was $22,828, a decrease of $16,557. Powell County had the largest placer output, $5,752. The placer output of Madison County was $5,239, or less than half that of 1925. Lewis and Clark County produced $199,467 in gold, mostly from gold ore, and Silver Bow County $679,637, chiefly from copper-silver ores and lead-zinc ores. At amalgamation and cyanidation plants $261,481 in gold was recovered, an average of $4.12 per ton of ore and old tailings treated. Ore and old tailings treated at concentration mills resulted in concentrates yielding $720,317 in gold, or 54 cents to the ton of concentrates, and crude ore shipped to smelters yielded $175,113 in gold, an average of $1.11 a ton.

Silver.—Copper ore from Montana mines yielded 7,762,190 ounces of silver in 1926 (an average of 2.44 ounces a ton), of which Silver Bow County (Butte) supplied 7,755,861 ounces. The lead-zinc ore yielded 3,354,233 ounces. The dry and siliceous ores yielded 345,456 ounces, of which Silver Bow County supplied 84,651 ounces and Granite County 88,848 ounces.

NEVADA

Gold.—The mine production of gold in the Comstock district of Nevada in 1926 was $1,181,277, compared with $1,196,946 in 1925. Nye County produced $654,693, of which $420,002 came from Tonopah. Siliceous ore yielded 126,615 fine ounces, copper ore 36,409 ounces, lead ore 8,538 ounces, and placers 2,866 ounces.

Silver.—Nye County (almost wholly the Tonopah district) again led in the production of silver, with 1,941,406 ounces, or 1,157,107 ounces less than in 1925. Sixty-nine per cent of the State's output of silver came from dry and siliceous ores; nearly 66 per cent of it was recovered by cyanidation. Lead ore yielded 1,395,285 ounces, lead-zinc ore 322,613 ounces, copper-lead ore 147,470 ounces, and copper ore 142,316 ounces.

NEW MEXICO

Gold.—The mine production of gold in New Mexico in 1926 came mainly from Hidalgo County, which produced $242,183; Grant County produced $116,525, and Colfax County $20,599. Copper ore yielded 17,510 ounces of gold, compared with 15,636 ounces in 1925; dry and siliceous ore yielded 1,429 ounces; lead-zinc ore 343 ounces; lead ore 209 ounces; and zinc ore 10 ounces. The placer output was 130 ounces.

Silver.—Hidalgo County produced 135,505 ounces of silver, mainly from copper ore, and Grant County 118,485 ounces, largely from copper, lead, and lead-zinc ores. Copper ore yielded 164,460 ounces and siliceous ore 142,735 ounces, lead ore and copper-lead ore 80,211 ounces, lead-zinc ore 59,375 ounces, and zinc ore 4,108 ounces. The placer output was 45 ounces.

OREGON

Gold.—The placer mines in Oregon produced $122,758 in gold in 1926, or $64,061 less than in 1925. The output from lode mines was $151,001—a decrease of $54,589 from 1925—92 per cent of it was obtained from siliceous ore. Two dredges, one in Baker County and one in Grant County, produced $74,191, and drift and hydraulic mines and surface placers in Baker, Coos, Curry, Douglas, Grant, Jackson, Josephine, Malheur, Marion, and Wheeler Counties produced the remainder of the placer gold. Baker and Grant Counties produced $75,564 and $114,532 in gold, respectively, in 1926.

Silver.—Of the total production of silver, 22,408 ounces came from siliceous ore, 6,482 ounces from copper ore, and 843 ounces from placer bullion.

SOUTH DAKOTA

The total value of gold produced in South Dakota from 1876 to the end of 1926 was $261,038,331, and the total output of silver for the same period was 7,392,928 fine ounces.

Gold.—The mine production of gold in South Dakota in 1926 was derived almost wholly from siliceous milling ore of low grade. About 67 per cent of the lode-mine output was recovered by amalgamation and the remainder by cyanidation. The Homestake mills treated 1,415,775 tons of ore from the Homestake mine and recovered $5,777,400 in gold. Two placers yielded $133 in gold.

Silver.—The mine output of silver, 82,186 ounces, was derived from refining the gold bullion produced.

SOUTHERN APPALACHIAN AND EASTERN STATES

Gold.—The total production of gold from 1799 to the end of 1926 in the southern Appalachian States, as shown from data compiled by the Bureau of the Mint, the United States Geological Survey, and the Bureau of Mines was $51,125,788. The data credit Alabama with $766,746, Georgia with $17,843,131, Maryland with $71,405, North Carolina with $23,660,072, South Carolina with $5,182,618, Tennessee with $303,380, and Virginia with $3,298,436. The mine production of gold in the southern Appalachian States in 1926 was $13,860, compared with $35,712 in 1925.

Tennessee led among the Eastern States in the production of gold, and Georgia was second. The gold produced in Tennessee (417 ounces) was derived from copper ore of the Ducktown district; the gold produced in Pennsylvania (nearly 22 ounces) was derived from copper concentrates from pyritiferous magnetite ore; siliceous ore from North Carolina and Georgia yielded 173 ounces; and copper ore from Vermont yielded 2 ounces. The production of gold from placers amounted to nearly 81 ounces.

Silver.—Copper ore from Tennessee yielded 104,000 ounces of silver in 1926; copper concentrates from pyritiferous magnetite ore from Pennsylvania yielded 544 ounces; and copper ore from Vermont yielded 1,965 ounces. Siliceous ore yielded 27 ounces, and placers 3 ounces.

TEXAS

The total output of gold from Texas mines from 1885 to the end of 1926 is given by Charles W. Henderson as $46,679 and the output of silver for the same period as 18,987,280 ounces.

Gold.—The small yield of gold has been mainly a by-product. The output in 1926 was $2,270, all from Presidio County.

Silver.—The silver produced in Texas in 1926 (447,237 ounces) nearly all came from the Presidio mine; the remainder of the silver came from silver ore, copper ore, and lead ore shipped to smelters.

UTAH

Gold.—The total output of gold in Utah from 1864 to the end of 1926 was $117,867,487. In 1926 the Bingham district, in Salt Lake County, produced $2,490,239; the Tintic district, in Juab and Utah Counties, $776,854; and the Park City region, in Summit and Wasatch Counties, $393,271. No gold was recovered by amalgamation or cyanidation. Fifty-five per cent of the gold was derived from copper ore, mined mainly in Salt Lake County; nearly 32 per cent from lead and lead-zinc ores; and 13 per cent from siliceous ore.

Silver.—The total output of silver in Utah from 1864 to the end of 1926 was 510,782,591 ounces. In 1926 Juab County made the largest production, 5,088,183 ounces, mainly from lead ore and silver ore, compared with 5,654,551 ounces in 1925. Wasatch County produced 3,642,620 ounces; Salt Lake County produced 3,738,505 ounces, of which 3,528,460 ounces came from the Bingham district; and Utah County 3,488,169 ounces, mostly from lead and siliceous ores. The Tintic district, in Juab and Utah Counties, produced 8,550,848 ounces, mainly from lead and siliceous ores; and the Park City region, in Summit and Wasatch Counties, produced 6,620,817 ounces, nearly all from lead-zinc, lead, and siliceous ores. Altogether in 1926 the lead-zinc ore of Utah yielded 7,402,838 ounces of silver, lead ore

7,307,599 ounces, dry and siliceous ore 3,365,644 ounces, and copper ore 1,281,767 ounces. The crude ore smelted in 1926 yielded 10,205,700 ounces, and concentrates 8,272,461 ounces.

WASHINGTON

The total production of gold in Washington from earliest mining to the end of 1926 is given by C. N. Gerry as $29,517,552, and the total production of silver as 8,949,094 ounces.

Gold.—Of the mine production of gold in Washington in 1926 78 per cent was derived from ore shipped direct to smelters and 14.5 per cent from placer mines. Siliceous ore supplied 82.5 per cent and copper, lead, and lead-zinc ores 3 per cent. Ferry County produced $156,802 in 1926, compared with $133,809 in 1925, virtually all of which came from mines in the Republic district. Kittitas County produced $27,480 in gold.

Silver.—Of the mine production of silver, Ferry County produced 59,160 ounces, mainly from siliceous ore, and Stevens County 90,693 ounces, virtually all from lead ore and lead-zinc ore.

WYOMING

The total production of gold in Wyoming from 1867 to the end of 1926 was $1,237,624 and the output of silver for the same period 70,113 ounces.

None of the mines in Wyoming have reported any output of gold or silver since 1923.

PHILIPPINE ISLANDS

Gold.—The output of gold in the Philippine Islands from 1907 to 1926, inclusive, was $21,684,602. The production during the last 10 years was as follows:

1917	$1, 408, 161	1922	$1, 526, 400
1918	1, 290, 000	1923	1, 686, 327
1919	1, 309, 722	1924	1, 651, 796
1920	1, 276, 561	1925	1, 945, 990
1921	1, 313, 096	1926	1, 925, 188

The yield of gold in 1926 from lode mines producing siliceous ore was 89,802 ounces. The gold derived from placers, nearly all from dredging, amounted to 3,329 ounces.

An article [3] has been published giving data on operations by the Benguet Consolidated Mining Co., the Balitoc Mining Co. (formerly known as the Acupan mines), the Itogan Mining Co., and the Ukap Mining Co., as well as development work at the Douglas, Comote, Kelly, and other mines and properties.

The annual report of the Benguet Consolidated Mining Co.[4] for 1926 states that 87,500 tons of ore (5,200 tons less than in 1925) was cyanided, yielding $17.77 a ton in gold and silver. The bullion recovered was $1,450,522. The ore reserves were estimated to be larger than at the end of 1925. The capacity of the mill is 200 tons a day, and the net profit from operations in 1926 was $726,968.

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[3] Eye, C. M., Philippine gold mining in 1926: Eng. and Min. Jour., Mar. 5, 1927, p. 414.

[4] Engineering and Mining Journal: Mar. 26, 1927, p. 548.

Silver.—The mine production of silver in the Philippine Islands in 1926 was recovered entirely from gold bullion refined, as no attempt was made to develop the known deposits of silver ore. The quantity of silver derived from bullion in 1926 was 46,154 fine ounces.

NUMBER OF PRODUCING MINES

The following table indicates the number of mines that produced gold and silver in 1926. The placers are those in which the gold and the silver that is in natural alloy with the gold and, in a few placers, with platinum also are recovered from gravel and sand, whether by hand washing, sluicing, hydraulicking, drifting (in frozen ground or ancient buried river channels), or dredging. The lode mines are those producing gold and silver (from ore as distinguished from gravel) mainly from underground workings, including those whose ore is valuable chiefly for copper, lead, or zinc but which contribute precious metals as by-products. In addition to producing mines here enumerated, many properties were being prospected and developed, and many other mining claims were being held by assessment work only.

The enumeration of placer mines is less satisfactory than that of lode mines, because some of the operations are only temporary and individually small and because much of the production is made by transitory miners not regularly working placer ground. The unit so far as possible is, as for lode mines, not the operator but the mining claim or group of claims.

Number of mines in the United States producing gold and silver in 1926, by States[1]

State or Territory	Placer	Lode	Total
Alaska	455	24	479
Arizona	21	362	383
California	483	335	818
Colorado	31	387	418
Georgia	3	3	6
Idaho	69	177	246
Illinois[2]		3	3
Michigan[2]		2	2
Missouri[2]		2	2
Montana	58	335	393
Nevada	28	377	405
New Mexico	12	116	128
North Carolina[2] and South Carolina	2	2	4
Oregon	100	49	149
Pennsylvania[2]		1	1
South Dakota	2	2	4
Tennessee[2]		2	2
Texas		6	6
Utah	2	164	166
Vermont		1	1
Virginia[2]	1		1
Washington	9	49	58
	1,276	2,399	3,675

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[1] Philippine Islands excluded.

[2] Number of mines contributing to production of gold and silver.

Number of mines in the United States producing gold and silver, 1917–1926

Year	Placer	Lode	Total
1917	1,552	3,811	5,363
1918	1,414	3,287	4,701
1919	1,105	2,460	3,565
1920	1,012	2,331	3,343
1921	1,357	1,967	3,324
1922	1,359	2,206	3,565
1923	1,295	2,188	3,483
1924	1,095	2,032	3,127
1925	1,236	2,445	3,681
1926	1,276	2,399	3,675
Average	1,270	2,513	3,783

The total number of properties operated in 1926 was 108 less than the average for the last 10 years. Although the number of placer properties worked showed an increase of 40 compared with 1925, this was 1,040 less than the number operated in 1906. The general decline in number of placer operations is a natural result of the exhaustion of the rich gravel and of the acquisition of large areas of placer ground by dredge companies. The number of lode mines operated was 46 less than in 1925 and 114 less than the average for the last 10 years.

Increases in the number of lode mines operated were recorded in 1926 in California, Montana, New Mexico, Texas, and Washington. The increase in the number of placer mines was mainly in California and Oregon. The decrease in the number of placer mines was mainly in Alaska, Idaho, and Montana.

ORE PRODUCTION, CLASSIFICATION, AND AVERAGE VALUE

The best index of lode mining is found in the quantity, metallic content, and value of ore mined, rather than in the number of mines or of operators. In the next table are given the production of ore from mines producing gold and silver and the average extraction value of precious metals per ton.

The classification adopted is necessarily arbitrary in part. The complex nature of western ores especially and the gradations from one well-recognized class to another render essential a fixed terminology. The dry and siliceous ores comprise gold and silver ores proper, as well as fluxing ores carrying considerable quantities of iron and manganese oxides and very small quantities of gold and silver, and precious metal-bearing ores carrying copper, lead, or zinc in quantities too low to classify them as copper, lead, zinc, or mixed ores. The distinction between gold and silver ores is not here made. The total number of silver mines and the total production of true silver ore are both comparatively small. The copper ores include those containing 2.5 per cent or more of copper, or less than this percentage in the great disseminated copper deposits of the West and in the Lake Superior ores. In general, the lead ores are those containing 4.5 per cent or more of lead, and the zinc ores are those containing 25 per cent or more of zinc, both irrespective of their precious-metal content; but ores of lower grades in lead and especially in zinc are treated profitably in many districts, and, of course, they are then classified as lead or zinc ores, as the case may be. The mixed ores are combinations of those enumerated.

The lead, zinc, and lead-zinc ores in most districts in the Eastern and Central States carry no appreciable quantity of gold or silver, and such ores are excluded from this report.

The total quantity of ore sold or treated annually from which gold or silver was produced decreased from the record of 68,000,000 tons in 1918 to 21,500,000 tons in 1921 and has increased steadily since that year; in 1925 the quantity was 61,553,616 tons, and in 1926 it was 65,787,864 tons.

The quantity of copper ore sold or treated in 1926 increased 3,877,900 tons, or 8 per cent, largely because of increased activities in Arizona, Nevada, and Utah. The quantity of lead-zinc ore increased 757,000 tons, or 28 per cent, over 1925, and the quantity in 1926 was nearly double that in 1924. The decreases in 1926 were in siliceous ore and lead ore.

Arizona led in quantity of ore by 6,526,500 tons, as its output was mainly copper ore. Utah was second, because of its copper, lead-zinc, lead, and siliceous ores. Nevada was third, with 83 per cent of its output copper ore, and Alaska fourth, with an output of which the larger part was dry and siliceous ore. Montana, New Mexico, Idaho, Colorado, California, and South Dakota followed in order of output. The bulk of the ore from Alaska, South Dakota, and Colorado was low-grade siliceous ore, and that from Idaho was mainly lead ore and lead-zinc ore. All the ore from Michigan was low-grade copper ore, and 95 per cent of the ore treated from New Mexico was copper ore.

Ore produced in the United States and average extraction value of gold and silver per ton in 1926, by States[1]

State or Territory	Dry and siliceous ore		Copper ore		Lead ore		Zinc ore		Copper-lead and copper-lead-zinc ores		Lead-zinc ore		Total (short tons)
	Short tons	Average value	Short tons	Average value	Short tons	Average value	Short tons	Average value	Short tons	Average value	Short tons	Average value	
Alaska	3, 924, 925	$0. 75	[2] 670, 427	$0. 62	(2)								4, 595, 352
Arizona	139, 949	9. 54	22, 031, 292	. 33	157, 854	$4. 23	6, 533	$3. 45	25, 020	$5. 80	22, 037	$2. 70	22, 382, 685
California	717, 326	10. 04	930, 464	. 52	30, 445	3. 32	57, 079	1. 98	383	15. 50	25, 162	1. 75	1, 760, 859
Colorado	1, 240, 195	6. 76	2, 126	19. 41	93, 531	4. 62	8, 284	. 02	97	21. 88	495, 507	2. 24	1, 839, 740
Georgia	4, 140	. 48											4, 140
Idaho	5, 862	13. 15	28, 258	9. 80	1, 084, 345	2. 66			22, 037	12. 65	793, 641	1. 65	1, 934, 143
Michigan			[3] 94, 007	. 70									94, 007
Montana	93, 571	7. 56	3, 179, 051	1. 70	132, 039	2. 81	20, 991	3. 83	224, 322	1. 89	820, 081	2. 69	4, 470, 055
Nevada	806, 518	6. 73	4, 888, 681	. 17	111, 265	9. 41	312	1. 25	10, 151	9. 48	67, 641	3. 21	5, 884, 568
New Mexico	25, 876	4. 58	3, 644, 936	. 13	22, 508	2. 41	115, 409	. 02	5	10. 48	17, 160	2. 57	3, 825, 894
North Carolina	420	3. 81	(4)										420
Oregon	16, 095	9. 53	5, 632	2. 78									21, 727
Pennsylvania			[5] 993, 450	[5]. 06									993, 450
South Dakota	1, 415, 785	4. 12											1, 415, 785
Tennessee			[6] 605, 540	. 12	(7)		(7)						605, 540
Texas	33, 912	8. 29	61	. 64	69	4. 14							34, 042
Utah	301, 213	8. 63	13, 949, 866	. 21	383, 857	12. 91	2, 573	. 19			1, 218, 635	4. 45	15, 856, 144
Vermont			14, 970	. 08									14, 970
Washington	17, 599	11. 06	25, 297	. 61	7, 659	6. 94	3, 185				603	14. 34	54, 343
	8, 743, 386	4. 03	51, 064, 058	. 36	2, 023, 572	5. 26	214, 366	1. 03	282, 015	3. 38	3, 460, 467	3. 01	65, 787, 864
Percentage	13. 29		77. 62		3. 08		0. 32		0. 43		5. 26		100. 00
1925: Total	8, 994, 910	4. 57	47, 186, 114	. 42	2, 271, 077	6. 20	169, 432	. 79	228, 612	3. 44	2, 703, 471	3. 37	61, 553, 616
Percentage	14. 61		76. 66		3. 69		0. 28		0. 37		4. 39		100. 00

[1] Illinois, Missouri, and Philippine Islands not included; quantity of crude ore containing gold and silver not known.
[2] Small quantity of lead ore included with copper ore.
[3] Includes only copper ore that yielded silver.
[4] Copper ore shipped yielded no gold or silver.
[5] Ore is pyritiferous magnetite yielding 13,408 tons of low-grade copper concentrates; value given is per ton of concentrate.
[6] Includes only copper ore that yielded gold and silver.
[7] Ores yielded no gold or silver.

The value of the gold and silver recovered from sources other than siliceous ore and placer bullion in the United States (Philippine Islands excluded) in 1926 was $40,401,782. Reports show that this gold and silver was derived from about 57,044,478 tons of base ores, which yielded an average of 71 cents a ton. Of this average only about 17 cents represents gold.

The average recovery from siliceous ore in 1926 was $3.06 in gold a ton, so that a ton of siliceous ore yielded 18 times as much gold as the average derived from a ton of ore of all other classes combined and 20.7 times as much as was derived from a ton of copper ore which constituted about 78 per cent of the total quantity of ores containing gold and silver in 1926. For this reason any large increase in the production of gold in the United States can not be expected by reason of increase in the quantity of base ores mined, even though the quantity should be doubled.

In 1926 the lead ore of Utah showed an average recovery in gold and silver of $12.91 a ton and that of Idaho, which produced more than half of the total output of lead ore containing gold, only $2.66 a ton. In the output of ore considered as producing gold and silver, the proportion of dry and siliceous ore decreased from 14.61 to 13.29 per cent; that of lead ore decreased from 3.69 to 3.08 per cent; and that of copper ore increased from 76.66 to 77.62 per cent. The proportion of all other classes of ore combined increased from 5.04 per cent of the total in 1925 to 6.01 per cent in 1926.

During the period 1906 to 1926 the peak of production of dry and siliceous ores was reached in 1916, although the proportion of such ores to the total was largest in 1906. The extraction value of these ores varies considerably in different years, depending to a large degree on the quantity of low-grade ores milled in Alaska and South Dakota, which aggregated more than 61 per cent of the siliceous ores treated in 1926. The decided decrease in the average extraction value of gold and silver in copper ore—from $1.55 a ton in 1906 to 36 cents in 1926—was caused by the low gold and silver content in the greatly increased quantity of copper ore derived from mines in Arizona, New Mexico, Nevada, and Utah. As silver predominates over gold in most of the lead ore and the value of the silver is about 10 times that of the gold for lead ores, the average extraction value shows a wider range than the quantity of ore. Zinc ore formed less than half of 1 per cent of the total ore given in the following table, and its average extraction value in precious metals shows a considerable range. The lead-zinc ores yielded an average of only 38 cents a ton in gold, but contained more than 4 ounces of silver a ton. The copper-lead and copper-lead-zinc ores have been negligible in quantity, although increasing since 1921.

Ore produced in the United States and average extraction value of gold and silver per ton, 1917–1926 [1]

Year	Dry and siliceous ore		Copper ore		Lead ore	
	Short tons	Average value	Short tons	Average value	Short tons	Average value
1917	12,166,026	$5.56	49,049,181	$0.49	2,494,077	$6.88
1918	9,702,240	6.58	53,409,729	.50	2,356,585	8.24
1919	9,302,229	6.25	29,919,369	.61	1,815,243	9.33
1920	8,590,139	6.26	32,447,410	.52	2,368,619	8.26
1921	8,436,214	6.65	10,930,888	.54	2,053,575	7.89
1922	8,728,222	6.98	23,356,128	.56	2,123,673	8.24
1923	9,121,719	5.91	41,596,309	.42	2,287,494	7.56
1924	8,979,113	5.21	44,887,379	.39	2,358,602	5.71
1925	8,994,910	4.57	47,186,114	.42	2,271,077	6.20
1926	8,743,386	4.03	51,064,058	.36	2,023,572	5.26

Year	Zinc ore		Copper-lead and copper-lead-zinc ores		Lead-zinc ore		Total (short tons)
	Short tons	Average value	Short tons	Average value	Short tons	Average value	
1917	641,755	$0.90	31,675	$14.58	2,793,613	$2.82	67,176,327
1918	210,298	.76	15,698	16.19	2,352,350	3.47	68,046,900
1919	88,654	.52	17,632	15.97	1,365,945	4.91	42,509,072
1920	482,229	3.00	26,890	30.01	1,443,904	4.10	45,359,191
1921	10,116	.76	14,248	31.76	122,287	16.96	21,567,328
1922	471,172	3.68	52,370	13.76	444,845	7.89	35,176,410
1923	723,994	2.55	162,181	7.30	1,203,698	3.39	55,095,395
1924	145,858	.14	219,874	3.83	1,791,852	3.14	58,382,678
1925	169,432	.79	228,612	3.44	2,703,471	3.37	61,553,616
1926	214,366	1.03	282,015	3.38	3,460,467	3.01	65,787,864

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[1] Arkansas, Illinois, Missouri, Philippine Islands, and Porto Rico excluded. Crude ore containing gold and silver not known.

MINE PRODUCTION OF GOLD, BY SOURCES

As shown in the following table, 78.53 per cent of the domestic output of gold in 1926 was obtained from dry and siliceous ores—normally gold quartz and gold-silver quartzose ores—and from placers. The total contribution of gold from the great copper, lead, and zinc mines of the country is relatively small, notwithstanding their enormous development and production of ore; the contribution from this source in 1926 was considerably greater than in 1925 because of the larger quantities of base ores, especially copper ores and lead-zinc ores, treated.

Mine production of gold in the United States in 1926, by States, in fine ounces [1]

State or Territory	Placers	Dry and siliceous ore	Copper ore	Lead ore	Zinc ore	Copper-lead and copper-lead-zinc ores	Lead-zinc ore	Total
Alaska	182, 325. 37	140, 190. 76	1, 693. 13	241. 87				324, 451. 13
Arizona	338. 96	50, 685. 30	167, 920. 23	10, 686. 05	66. 24	2, 607. 66	1, 706. 53	234, 010. 97
California	252, 923. 99	310, 520. 77	11, 233. 14	1, 027. 29	950. 99	135. 60	6. 62	576, 798. 40
Colorado	2, 271. 40	320, 977. 34	688. 99	1, 997. 82	2. 67	23. 32	16, 438. 30	342, 399. 84
Georgia	52. 68	96. 03						148. 71
Idaho	8, 360. 45	2, 995. 17	431. 64	1, 455. 74		33. 98	392. 29	13, 669. 27
Montana	1, 104. 30	23, 810. 07	27, 289. 67	2, 391. 32	161. 92	331. 43	5, 415. 40	60, 504. 11
Nevada	2, 866. 17	126, 615. 10	36, 408. 95	8, 538. 16		203. 51	749. 79	175, 381. 68
New Mexico	129. 98	1, 428. 68	17, 509. 81	209. 17	9. 90		343. 18	19, 630. 72
North Carolina	2. 08	76. 82						78. 90
Oregon	5, 938. 42	6, 742. 36	562. 32					13, 243. 10
Pennsylvania [2]			21. 77					21. 77
South Carolina	15. 14							15. 14
South Dakota	6. 43	279, 522. 50						279, 528. 93
Tennessee			417. 09					417. 09
Texas		104. 20		5. 61				109. 81
Utah	16. 16	24, 097. 08	100, 853. 65	19, 095. 25	1. 98		38, 698. 86	182, 762. 98
Vermont			1. 98					1. 98
Virginia	10. 64							10. 64
Washington	1, 354. 50	7, 707. 83	190. 98	75. 27			12. 24	9, 340. 82
	457, 716. 67	1, 295, 570. 01	365, 223. 35	45, 723. 55	1, 193. 70	3, 335. 50	63, 763. 21	2, 232, 525. 99
Value	$9, 461, 843	$26, 781, 809	$7, 549, 837	$945, 190	$24, 676	$68, 951	$1, 318, 102	$46, 150, 408
Percentage	20. 50	58. 03	16. 36	2. 05	0. 05	0. 15	2. 86	100. 00
1925: Total	436, 251. 11	1, 414, 445. 43	348, 025. 22	50, 378. 39	374. 66	5, 514. 92	52, 384. 25	2, 307, 373. 98
Value	$9, 018, 111	$29, 239, 182	$7, 194, 320	$1, 041, 414	$7, 745	$114, 003	$1, 082, 879	$47, 697, 654
Percentage	18. 91	61. 30	15. 08	2. 18	0. 02	0. 24	2. 27	100. 00

[1] Philippine Islands excluded. The Bureau of Science, Manila, P. I., reports that bullion from lode mines of the Philippine Islands yielded 89,802 ounces of gold and placer mines 3,329 ounces.

[2] From pyritiferous magnetite ore.

During the period 1917 to 1926 dry and siliceous ores yielded 63.5 per cent of the total output of gold; placer mining, 23.6 per cent; copper ore, 9.5 per cent; and all other ores, 3.4 per cent. It is evident that there can be no great increase from the miscellaneous base ores. The yield from copper ore may continue to increase, but probably not in great amount. The yield of gold from placers in 1926 was less than half that of the average of the years 1906 to 1916, and although there may be spasmodic increases during the next few years, it is certain that the output from this source will decline because of the steady exhaustion of ground capable of being worked with dredges. Apparently any large increases in the yield of gold must come from dry and siliceous ores, which have yielded nearly two-thirds of the output in the last 22 years. As the production from these ores has decreased 60 per cent since 1915 and as no new large bodies of ore of this class have been discovered, there is apparently no reason to expect that the annual yield of gold from mines in the United States will exceed $45,000,000 to $50,000,000, and it may be considerably less.

Gold produced in the United States, by sources, as reported by mines, 1917–1926, in fine ounces [1]

Year	Placers	Dry and siliceous ores	Copper ore	Lead ore	Zinc ore	Copper-lead and copper-lead-zinc ores	Lead-zinc ore	Total
1917	1,026,062	2,416,985	341,117	68,464	6,085	4,474	37,022	3,900,209
1918	758,202	2,045,495	309,018	55,246	1,188	1,431	42,093	3,212,673
1919	704,377	1,780,567	186,701	41,945	86	1,043	38,563	2,753,282
1920	663,002	1,523,331	171,055	46,776	3,657	3,731	31,435	2,382,987
1921	677,435	1,548,251	52,765	61,924	76	159	4,400	2,345,010
1922	537,910	1,560,789	130,928	35,415	2,807	2,467	22,935	2,293,251
1923	551,929	1,510,098	271,690	38,109	3,321	3,801	25,965	2,404,913
1924	450,720	1,602,469	310,413	39,947	227	1,995	38,560	2,444,331
1925	436,251	1,414,446	348,025	50,378	375	5,515	52,384	2,307,374
1926	457,717	1,295,570	365,223	45,724	1,194	3,335	63,763	2,232,526

[1] Philippine Islands and Porto Rico excluded.

PLACERS

General features.—The States showing the largest increases in placer gold in 1926 were Alaska (26,413 ounces), California (6,398 ounces), Washington (1,302 ounces), and Nevada (330 ounces). Those showing the largest decreases were Colorado (5,000 ounces), Idaho (4,332 ounces), Oregon (3,099 ounces), and Montana (801 ounces).

The placer gold is derived chiefly from dredging (which yielded 79.5 per cent of the total in 1926), from drift mining (which is of decreasing importance in Alaska in frozen ground at no great depth but of continued importance in California in ancient buried river channels, in places at considerable depth), and from hydraulic and sluicing placers. Finally, there is a small annual output of gold from dry placers in the Southwest and also of gold and platinum from ocean-beach mining in California and Oregon.

Dredging.—The value of gold produced by dredging in the United States from the commercial beginning of the industry in 1896 to the end of 1926 has amounted, according to the best available data, to $211,119,287, of which $150,071,842 came from California, $32,150,474 from Alaska, $9,592,435 from Montana, $7,964,003 from Colorado, $5,779,398 from Idaho, $4,934,001 from Oregon, and $627,134 from other States. The production of gold from dredges in 1926 was $691,757 more than in 1925, and the number of dredges operated was three more. Previous issues of Mineral Resources, reports of the Director of the Mint, and reports of geological surveys or mining officials of different States contain further information, especially for earlier years.

Gold produced in the United States by dredges, 1917–1926

Year	Dredges	California	Alaska	Other States [1]	Total
1917	109	$8,313.527	$2,500,000	$1,736.898	$12,550,425
1918	93	7,431,927	1,425,000	1,485,173	10,342,100
1919	91	7,716,919	1,360,000	1,269,297	10,346,216
1920	78	6,900,366	1,129,932	1,256,158	9,286,456
1921	72	7,756,787	1,582,520	1,196,261	10,535,568
1922	71	4,999,215	1,767,753	922,300	7,689,268
1923	66	6,065,735	1,848,596	1,084,716	8,999,047
1924	63	4,305,521	1,563,361	1,044,099	6,912,981
1925	60	4,750,842	1,572,312	507,874	6,831,028
1926	63	4,950,545	2,291,000	281,240	7,522,785

[1] Colorado, Idaho, Montana, Nevada, New Mexico, and Oregon.

Of the output in 1926, California produced $4,950,545 from 23 dredges, Alaska $2,291,000 from 32 dredges, Idaho $141,160 from 3 dredges, Oregon $74,191 from 2 dredges, Colorado $38,860 from 2 dredges, and Washington $27,029 from 1 dredge. In addition, dredges operated in the Philippine Islands in 1926 produced $68,776 in gold and about 341 ounces of silver.

DRY AND SILICEOUS ORES

The siliceous ore comprises free-milling (amalgamating) ore, as in Alaska, California, and Oregon; both amalgamating and concentrating ore, as in many States; simply concentrating ore, as in parts of Colorado and Arizona; all-sliming and cyaniding ore, as in Nevada; and finally smelting ore. Tailings both from old dumps and from current millings are largely reworked by concentration and subsequent cyanidation or smelting. The material smelted consists mainly of concentrates and of siliceous and pyritic ores, which are also valuable as fluxes. Figures of relative output by methods and by States are given on page 704.

As most of the gold produced in the United States is derived from placer gravel and dry and siliceous ores, including true gold, gold-silver, and silver ores, the following table for certain States is of special interest:

Gold produced in six Western States, 1922–1926

State and year	Total (lode and placer)			Gold ore			
	Mines producing	Ore mined (short tons)	Gold (fine ounces)	Mines producing	Short tons	Gold (fine ounces)	
						Total	Average
Arizona:							
1922	318	10, 746, 045	170, 479. 98	72	173. 070	102, 814. 10	0. 59
1923	341	17, 015, 178	296, 109. 23	65	226, 585	142, 442. 85	. 63
1924	275	19, 820, 505	235, 995. 74	65	209, 356	92, 771. 09	. 44
1925	386	20, 927, 382	201, 740. 92	77	71, 289	33, 644. 79	. 47
1926	383	22, 382, 685	234, 010. 97	74	111, 083	47, 586. 24	. 43
Idaho:							
1922	248	1, 436, 884	24, 255. 46	36	21, 580	8, 734. 16	. 40
1923	231	1, 763, 520	37, 124. 28	47	21, 953	6, 247. 99	. 28
1924	220	1, 711, 988	26, 921. 80	39	17, 886	5, 646. 12	. 32
1925	275	1, 827, 715	20, 886. 92	50	13, 853	3. 678. 39	. 27
1926	246	1, 934, 143	13, 669. 27	41	5, 124	2, 811. 27	. 55
Montana:							
1922	393	4, 385, 878	80, 145. 62	77	161, 900	42, 695. 72	. 26
1923	382	5, 743, 535	85, 079. 43	78	217, 307	48, 277. 86	. 22
1924	388	4, 652, 482	97, 854. 16	110	154, 942	57, 701. 18	. 37
1925	424	4, 405. 008	82, 122. 85	98	149, 721	34, 351. 64	. 23
1926	393	4, 470, 055	60, 504. 11	101	80, 847	21, 583. 35	. 27
Nevada:							
1922	387	1. 565. 276	159, 510. 95	108	69, 337	57, 954. 24	. 84
1923	389	4, 354, 937	204, 292. 89	128	142, 148	64, 197. 59	. 45
1924	384	4, 699, 333	217, 962. 56	152	139, 041	70, 067. 65	. 50
1925	424	4, 927, 139	187, 104. 72	156	129, 914	59, 519. 79	. 46
1926	405	5, 884, 568	175, 381. 68	139	141, 967	51, 699. 25	. 36
Utah:							
1922	154	5, 560, 034	111, 110. 36	4	36. 624	15, 924. 48	. 43
1923	150	12, 752, 998	148, 824. 86	9	17, 903	9, 333. 57	. 52
1924	138	13, 640, 618	146, 486. 85	8	2, 129	2, 268. 12	1. 07
1925	179	14, 479, 247	177, 803. 08	8	8, 087	2, 411. 08	. 30
1926	166	15, 856, 144	182, 762. 98	7	344	1, 297. 40	3. 77
Washington:							
1922	46	36, 046	9, 044. 43	10	17, 944	8, 764. 15	. 49
1923	36	56, 900	16, 547. 49	12	30, 146	16, 310. 46	. 54
1924	34	44, 383	14, 977. 72	12	17, 543	14, 705. 87	. 84
1925	46	50, 287	11, 138. 49	8	15, 376	10, 870. 47	. 71
1926	58	54, 343	9, 340. 82	9	17, 599	7, 707. 83	. 44

Gold produced in six Western States, 1922–1926—Continued

State and year	Gold-silver ore		Silver ore		Placer	
	Short tons	Gold (fine ounces)	Short tons	Gold (fine ounces)	Mines producing	Gold (fine ounces)
Arizona:						
1922	2, 031	1, 351. 19	71, 185	4, 249. 82	33	579. 58
1923	268, 537	35, 273. 99	71, 171	6, 742. 02	24	428. 31
1924	8, 291	4, 857. 81	22, 108	3, 001. 16	9	151. 85
1925	2, 036	432. 77	51, 665	2, 886. 27	18	206. 42
1926	9, 440	1, 713. 32	19, 426	1, 385. 74	21	338. 96
Idaho:						
1922	257	193. 81	3, 929	156. 97	94	8, 899. 64
1923	311	82. 91	1, 795	239. 24	85	24, 125. 05
1924	17	30. 86	1, 357	131. 45	79	17, 324. 10
1925	434	317. 89	3, 848	58. 25	85	12, 692. 92
1926	44	107. 85	694	76. 05	69	8, 360. 45
Montana:						
1922	6, 594	1, 079. 35	204, 817	9, 568. 17	78	3, 472. 65
1923	275	394. 11	124, 671	6, 071. 84	78	1, 972. 68
1924	161	133. 32	52, 384	5, 339. 76	86	1, 323. 59
1925	1, 209	276. 45	43, 761	3, 453. 34	93	1, 905. 25
1926	1, 415	482. 70	11, 309	1, 744. 02	58	1, 104. 30
Nevada:						
1922	44, 503	10, 189. 16	758, 043	72, 362. 96	42	11, 602. 36
1923	551, 504	39, 417. 45	678, 318	63, 579. 46	35	3, 941. 83
1924	524, 248	48, 099. 53	403, 190	63, 460. 37	36	1, 323. 97
1925	424, 077	46, 224. 28	290, 957	35, 134. 18	25	2, 536. 54
1926	433, 749	50, 090. 77	230, 802	24, 825. 08	28	2, 866. 17
Utah:						
1922	4, 145	2, 178. 47	373, 570	20, 250. 67	7	103. 04
1923	23, 722	3, 095. 32	304, 800	20, 285. 62	4	25. 49
1924	39, 490	11, 287. 00	240, 607	13, 543. 63	2	11. 22
1925	119, 337	22, 081. 90	261, 606	9, 776. 84		
1926	113, 476	14, 165. 75	187, 393	8, 633. 93	2	16. 16
Washington:						
1922			6, 838	66. 72	13	162. 44
1923			3, 353	38. 46	6	73. 09
1924			32	. 28	4	33. 77
1925			7	5. 72	9	52. 87
1926					9	1, 354. 50

Nearly all the siliceous ore in three of the largest gold-producing States—Alaska, California, and South Dakota—yields only a small quantity of silver and is classed as gold ore. The siliceous ore from Colorado includes much silver and gold-silver ore.

Siliceous ore treated and gold recovered per ton of ore treated, 1917–1926

Year	Alaska		California		South Dakota		Colorado	
	Ore treated	Recovery per ton	Ore treated	Recovery per ton	Ore treated	Recovery per ton	Ore treated	Recovery per ton
	Short tons	*Ounce*	*Short tons*	*Ounce*	*Short tons*	*Ounce*	*Short tons*	*Ounce*
1917	3, 414, 664	0. 065	2, 018, 003	0. 246	1, 867, 859	0. 191	1, 996, 590	0. 347
1918	2, 095, 577	. 080	1, 538, 960	. 261	1, 781, 569	. 178	1, 760, 222	. 322
1919	3, 262, 573	. 068	1, 212, 142	. 339	1, 330, 349	. 177	1, 667, 076	. 258
1920	3, 413, 736	. 063	788, 136	. 439	1, 356, 098	. 167	1, 224, 081	. 257
1921	2, 894, 813	. 064	902, 566	. 402	1, 725, 669	. 185	1, 230, 172	. 250
1922	2, 513, 455	. 058	1, 052, 148	. 414	1, 751, 454	. 180	1, 296, 501	. 221
1923	2, 502, 901	. 045	925, 659	. 347	1, 665, 439	. 186	1, 166, 470	. 243
1924	3, 127, 876	. 042	1, 075, 858	. 364	1, 674, 720	. 177	1, 074, 876	. 344
1925	3, 573, 540	. 042	886, 625	. 413	1, 590, 079	. 182	1, 187, 054	. 271
1926	3, 924, 925	. 036	717, 326	. 433	1, 415, 785	. 197	1, 240, 195	. 259

The quantity of siliceous ore treated in South Dakota in 1926 decreased, but the recovery of gold per ton was 31 cents more than in 1925; the siliceous ore in California also decreased, but the recovery of gold per ton was 41 cents more. The quantity of siliceous ore treated in Alaska increased, but the recovery of gold was the lowest ever recorded. The recovery of gold per ton in Colorado was 25 cents less than in 1925.

COPPER ORE

The gold obtained as a by-product in the treatment of copper ore showed an increase in 1926 of about $355,500, following an increase of $777,500 in 1925 and $800,000 in 1924. This source of gold contributed a larger percentage of the total gold yield than in 1925. The largest producer of gold from copper ore was Arizona, followed by Utah, Nevada, Montana, New Mexico, and California.

LEAD ORE

About 84 per cent of the gold in lead ore sold or treated in 1926 came from Utah, Arizona, and Nevada. The total production of gold from lead ore showed a decrease of 9 per cent compared with the output in 1925.

LEAD-ZINC, ZINC, AND MIXED ORES

The production of gold from zinc, lead-zinc, copper-lead, and copper-lead-zinc ores in 1926 was 10,019 ounces more than in 1925. Utah, Colorado, and Montana produced nearly all the gold from lead-zinc ore, and California and Montana produced most of the gold from zinc ore. Arizona, Montana, and New Mexico contributed most of the gold from copper-lead ore.

MINE PRODUCTION OF SILVER, BY SOURCES

The mine production of silver in 1926 from the chief sources—copper ore, lead ore, lead-zinc ore, and siliceous ore—was 97 per cent of the total compared with 98 per cent from the same classes of ore in 1925. The combined yield of silver from placer bullion, zinc ore, and copper-lead and copper-lead-zinc ores was 3 per cent of the total, compared with 2 per cent in 1925.

The production of silver as reported by the mines had increased pretty steadily from 1908 to 1916. A decline during the next three years was followed by partial recovery in 1920, another decline in 1921, a large increase in 1922, a considerable increase in 1923 until after the expiry of the Pittman Act, a large decrease in 1924, a fair increase in 1925, and a large decrease in 1926. The production of silver from lead and lead-zinc ores decreased from 30,355,708 ounces in 1925 to 30,101,870 ounces in 1926. The recovery from siliceous ore decreased about 3,532,800 ounces and was the smallest annual recovery in more than a score of years, being 15,000,000 ounces less than in the record year 1922. The recovery from copper ore decreased about 1,012,400 ounces. The total recovery of silver from base ores in 1926 was about 689,700 ounces less than in 1925.

Mine production of silver in the United States in 1926, by States, in fine ounces [1]

State or Territory	Placers	Dry and siliceous ore	Copper ore	Lead ore	Zinc ore	Copper-lead and copper-lead-zinc ores	Lead-zinc ore	Total
Alaska	24,870	59,940	597,818	7,372				690,000
Arizona	56	460,826	5,984,415	716,945	33,932	145,989	38,864	7,381,027
California	19,362	1,252,514	397,174	128,027	150,053	5,022	70,308	2,022,460
Colorado	569	2,798,387	43,312	626,986	230	2,628	1,232,010	4,704,122
Georgia	3	6						9
Idaho	2,029	24,335	429,343	4,575,490		445,520	2,079,727	7,556,444
Illinois [2]				2,990				2,990
Michigan			105,242					105,242
Missouri				90,000				90,000
Montana	162	345,456	7,762,190	514,628	123,437	668,986	3,354,233	12,769,092
Nevada	1,494	4,509,178	142,316	1,395,285	627	147,470	322,613	6,518,983
New Mexico	45	142,735	164,460	80,127	4,108	84	59,375	450,934
North Carolina		21						21
Oregon	843	22,408	6,482					29,733
Pennsylvania [3]			544					544
South Dakota		82,186						82,186
Tennessee			104,000					104,000
Texas		446,903	62	272				447,237
Utah	1	3,365,644	1,281,767	7,307,599	732		7,402,838	19,358,581
Vermont			1,965					1,965
Washington	456	56,556	18,456	82,733			13,448	171,649
	49,890	13,567,095	17,039,546	15,528,454	313,119	1,415,699	14,573,416	62,487,219
Value	$31,131	$8,465,867	$10,632,677	$9,689,755	$195,386	$883,396	$9,093,812	$38,992,024
Percentage	0.08	21.71	27.27	24.85	0.50	2.27	23.32	100.00
1925: Total	50,303	17,099,876	18,051,937	18,777,853	181,886	970,370	11,577,855	66,710,080
Value	$34,910	$11,867,314	$12,528,044	$13,031,830	$126,229	$673,437	$8,035,031	$46,296,795
Percentage	0.08	25.63	27.06	28.15	0.27	1.45	17.36	100.00

[1] Philippine Islands excluded. The Bureau of Science, Manila, P. I., reports that bullion from lode mines of the Philippine Islands yielded 45,813 ounces of silver and placer bullion yielded 341 ounces.

[2] From fluorspar-lead ores.

[3] From pyritiferous magnetite ore.

Silver produced in the United States, by sources, as reported by mines, 1917–1926, in fine ounces [1]

Year	Placers	Dry and siliceous ore	Copper ore	Lead ore	Zinc ore	Copper-lead and copper-lead-zinc ores	Lead-zinc ore	Total
1917	118,604	21,489,465	20,314,233	19,096,474	549,656	448,042	8,645,038	70,661,512
1918	89,494	21,564,982	20,462,597	18,291,243	135,676	224,580	7,290,380	68,058,952
1919	78,401	19,043,515	12,880,624	14,351,293	39,480	232,157	5,273,990	51,899,460
1920	73,383	20,477,612	12,151,424	17,069,506	1,258,341	669,503	4,837,135	56,536,904
1921	81,375	24,117,251	4,782,538	14,912,990	6,163	449,417	1,983,222	46,332,956
1922	60,769	28,631,579	10,376,123	16,756,835	1,676,967	669,809	3,035,907	61,207,989
1923	57,752	27,636,947	14,684,333	20,139,928	2,171,186	1,348,025	4,317,503	70,355,674
1924	51,251	20,388,065	16,335,433	18,858,782	24,431	1,194,323	7,218,459	64,070,744
1925	50,303	17,099,876	18,051,937	18,777,853	181,886	970,370	11,577,855	66,710,080
1926	49,890	13,567,095	17,039,546	15,528,454	313,119	1,415,699	14,573,416	62,487,219

[1] Philippine Islands and Porto Rico excluded.

PLACERS

The output of silver from the refining of placer gold in 1926 was 413 ounces less than in 1925. Of the total production, 89 per cent came from Alaska and California.

DRY AND SILICEOUS ORES

About 33 per cent of the mine production of silver from dry and siliceous ores in 1926 came from Nevada (chiefly from the Tonopah and Comstock districts), 25 per cent from Utah (mainly from the Tintic district), and 21 per cent from Colorado. The only increase in the quantity of silver from siliceous ore was in Washington; the largest decreases were in Utah, California, Nevada, and New Mexico.

A large part of the silver from gold-silver siliceous ore is obtained with the gold by amalgamation and cyanidation in the mills, and the silver is then recovered by refining the mill bullion. Very little of the gold and silver ores is treated by flotation, which is so extensively employed on base ores; only 525,660 tons of such ore was so treated in 1926, compared with 484,924 tons in 1925. The remainder of the silver is recovered by smelting the richer ore and refining the copper or lead bullion produced.

COPPER ORE

The silver produced from copper ore is obtained in the electrolytic refining of Lake and blister copper produced by smelting. The copper ore consists mainly of sulphides (except the Lake ore of Michigan, which consists of native metal in amygdaloid and conglomerate matrix), and a greater quantity contains chalcocite than chalcopyrite or cupriferous pyrite. The silver tenor of the extensive disseminated deposits of the Santa Rita district, N. Mex., and of Ely, Nev., is notably low, but similar deposits elsewhere add considerable quantities of silver.

In output of silver from copper ore Montana continued to lead, with a yield of 7,762,190 ounces in 1926, compared with 8,656,401 ounces in 1925; Arizona was second, with 5,984,415 ounces in 1926, compared with 5,795,173 ounces in 1925; and Utah was third, with 1,281,767 ounces in 1926 and 959,790 ounces in 1925. The production from Montana comes mainly from Butte, that of Arizona mainly from Bisbee and Jerome, that of Utah mainly from Bingham, and that of California mainly from Plumas County. Of these districts, Bisbee well represents the disseminated type, Bingham produces from both lode and disseminated deposits, and the remainder produce silver chiefly from copper ore mined from deep lodes. Some silver is also produced in leaching copper ore.

LEAD ORE

The mine production of silver from argentiferous lead ore was about 3,249,400 ounces less than in 1925. The largest increases in 1926 were as follows: Colorado, 99,508 ounces, and Nevada, 33,532 ounces. The largest decreases were as follows: Utah, 3,010,710 ounces; Idaho, 216,007 ounces; Arizona, 86,208 ounces; California, 46,467 ounces; and Montana, 17,591 ounces. The yield in Idaho is derived mainly from the silver-lead ore of the Coeur d'Alene region, that in Utah mainly from the Tintic and Park City districts, and that in Colorado from Leadville, Aspen, and the San Juan region. Most of the output is obtained from the desilverization of lead bullion from smelting of western ores and concentrates.

ZINC, LEAD-ZINC, AND MIXED ORES

Silver from argentiferous zinc ore increased from 181,886 ounces in 1925 to 313,119 ounces in 1926; it was mainly from zinc concentrates from California and Montana shipped to smelters. Silver from lead-zinc ore increased 26 per cent; it came chiefly from Utah, Montana, Idaho, and Colorado. Silver from copper-lead and copper-lead-zinc ores came mainly from Montana, Idaho, Nevada, and Arizona.

DISTRIBUTION OF PRODUCTION OF GOLD AND SILVER, BY METHODS OF TREATMENT

SUMMARY OF DISTRIBUTION

The following table gives the production of gold and silver from ore, old tailings, etc., treated in 1925 and 1926.

Gold and silver produced in the United States from ore, old tailings, etc., in 1926, by States and by methods of recovery [1]

State or Territory	Total quantity of crude ore, old tailings, etc., treated or sold in 1926 (short tons)	Ore, old tailings, etc., to gold and silver mills				Ore and old tailings to concentrating mills (short tons)	Concentrates from all sources			Crude ore to smelters			Ore leached, old tailings and slag smelted, etc.		
		Ore (short tons)	Old tailings, etc. (short tons)	Gold in bullion (fine ounces)	Silver in bullion (fine ounces)		Short tons	Gold (fine ounces)	Silver (fine ounces)	Short tons	Gold (fine ounces)	Silver (fine ounces)	Short tons	Gold (fine ounces)	Silver (fine ounces)
Alaska	4, 595, 352	3, 924, 794	--------	[2] 116, 030	[2] 18, 301	650, 177	76, 154	25, 123	443, 644	20, 381	973	203, 185	----------	--------	----------
Arizona	22, 382, 685	98, 695	--------	39, 288	51, 040	17, 926, 570	1, 074, 178	55, 516	1, 943, 130	2, 992, 876	137, 142	5, 292, 662	1, 364, 544	1, 726	94, 139
California	1, 760, 859	[3] 675, 095	2, 300	[4] 278, 190	[4] 351, 929	919, 190	94, 994	40, 262	1, 354, 070	63, 651	5, 321	286, 411	100, 623	101	10, 688
Colorado	1, 839, 740	958, 924	(5)	246, 627	41, 333	666, 382	156, 943	70, 139	2, 936, 278	214, 434	23, 362	1, 725, 942	----------	--------	----------
Idaho	1, 934, 143	4, 499	45	2, 030	925	1, 854, 249	293, 499	2, 208	6, 137, 680	75, 295	1, 069	1, 415, 024	55	2	786
Montana	4, 470, 055	59, 860	3, 510	12, 649	64, 799	4, 158, 983	1, 341, 539	37, 806	11, 787, 714	157, 579	8, 471	712, 481	90, 093	474	203, 936
Nevada	5, 881, 568	744, 900	4, 060	118, 422	4, 275, 788	4, 939, 033	447, 174	39, 477	1, 478, 537	194, 780	14, 559	751, 219	1, 795	58	11, 945
New Mexico	3, 825, 894	2, 348	--------	978	7, 459	3, 651, 738	192, 815	5, 648	83, 680	171, 808	12, 875	359, 750	----------	--------	----------
Oregon	21, 727	15, 565	--------	4, 198	4, 513	5, 238	1, 052	574	4, 098	924	2, 533	20, 279	----------	--------	----------
South Dakota	1, 415, 785	1, 415, 785	(6)	279, 523	82, 186	----------	----------	--------	----------	----------	--------	----------	----------	--------	----------
Texas	34, 042	33, 818	--------	98	416, 171	----------	183	6	30, 163	224	6	903	----------	--------	----------
Utah	15, 856, 144	----------	--------	----------	----------	15, 104, 854	1, 058, 014	124, 764	8, 272, 461	568, 004	42, 362	10, 205, 700	183, 286	15, 621	880, 419
Washington	54, 343	----------	--------	----------	----------	28, 836	3, 182	180	30, 403	23, 664	7, 269	139, 303	1, 843	537	1, 487
Eastern States	[7] 1, 618, 520	4, 560	--------	173	27	[8] 1, 292, 916	[8] 58, 446	205	66, 409	[8] 321, 044	236	40, 100	----------	--------	----------
	65, 693, 857	7, 938, 843	9, 915	1, 098, 206	5, 314, 471	51, 198, 166	4, 798, 164	401, 908	34, 568, 267	4, 804, 664	256, 178	21, 152, 959	1, 742, 239	18, 519	1, 203, 400
Total, 1925	61, 409, 460	7, 865, 847	156, 960	1, 189, 759	6, 527, 097	46, 759, 761	4, 695, 975	406, 282	33, 828, 909	5, 102, 274	261, 334	23, 759, 355	1, 521, 618	13, 769	2, 315, 459

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[1] Exclusive of gold or silver as follows: From copper ore in Michigan, from lead and lead-fluorspar ore in Illinois and Missouri, and from siliceous ore in Philippine Islands.

[2] Exclusive of bullion from 1,230 tons of concentrates amalgamated, figures for which are included under "Concentrates from all sources."

[3] Also 5,273 tons of concentrates from California were cyanided and yielded 18,735.50 ounces of gold and 4,423 ounces of silver. The figures are included under "Concentrates from all sources."

[4] Includes 20,687.89 ounces of gold and 3,798 ounces of silver from "high grade."

[5] Sands and slimes (304,969 tons) from ore and concentrates first treated by amalgamation were cyanided.

[6] Sands and slimes (1,402,472 tons) from ore first treated by amalgamation were cyanided.

[7] Includes low-grade pyritiferous magnetite ore from Pennsylvania; excludes ore containing no gold and silver

[8] Includes only ore or concentrates that yielded gold and silver.

The greatest output of ore, etc., was made in Arizona, Utah, Nevada, Montana, and New Mexico, all notable for large yields of copper ore; in Idaho, a large producer of lead ore and lead-zinc ore; in Alaska and California, large producers of both copper and siliceous ores; and in South Dakota and Colorado, large producers of siliceous ore.

The only large increases in ore sent direct to gold and silver mills were in Alaska, Colorado, and Arizona. Many gold and silver mills employ concentrating apparatus, and the concentrates they obtain are combined in the table with those from straight concentrating mills under the heading "Concentrates from all sources." The gold and silver included in this item are recovered partly by amalgamation (particularly in Alaska) and cyanidation, although most of the concentrates are smelted.

The figures for the quantity of ore treated by concentration include the large quantities of copper, lead, zinc, and mixed ores whose concentrates are smelted primarily for these metals, the gold and silver being recovered in refining the copper and lead bullion and smelting the zinc residues. The quantity of concentrates produced and the recoverable gold and silver content represent not only the concentrates from these straight concentrating mills but also the comparatively small quantity from gold and silver mills.

The ore treated in straight concentration mills increased 9.5 per cent in 1926, mainly because of the greater quantity of ore milled at copper mines in Arizona, New Mexico, Nevada, and Utah and at lead-zinc mines in Colorado, Idaho, and Utah. The quantity of gold-silver ore treated by flotation in 1926 was 525,660 tons, yielding 28,428 tons of concentrates, compared with 484,924 tons of ore in 1925, yielding 36,445 tons of concentrates. An increased quantity of gold and silver came from flotation concentrates, but only a small percentage of the concentrates was from the treatment of gold and silver ores, as only at six mines in the United States in 1926 were straight gold or silver ores treated by flotation. The greater number of flotation mills making concentrates containing gold and silver treat base ores.

About 76 per cent of the silver from concentrates came from Montana, Utah, and Idaho; large quantities also came from Colorado, Arizona, Nevada, and California.

The figures for the quantity and the recoverable precious-metal content of crude ore shipped from the mines direct to the smelters include, in general, the richer gold, silver, copper, lead, and mixed ores from which the gold and silver are eventually recovered by refining the copper or lead bullion that collects the precious metals in the smelting. There has been a large decrease in the last decade in the quantity of crude ore directly smelted and a large increase in the quantity of ore concentrated. Arizona produced 62 per cent of the ore directly smelted, and Utah and Arizona produced 73 per cent of the silver and 70 per cent of the gold recovered from crude ore smelted.

The old materials, mainly tailings and slags, re-treated (with which are included figures for ore and old tailings leached) are partly smelted, often for their fluxing as well as their metal value; the quantities of old tailings concentrated and cyanided in 1926 was small, although the impounding of mill tailings for future treatment, as well as because of legal requirements, has become a general practice. Most of the gold and silver derived from old tailings is included under recoveries by amalgamation and cyanidation at gold and silver mills. The quantity of ore leached in Arizona in 1926 was 1,330,163 tons. In addition to ore mined and leached, ore was leached in place in Utah and Nevada, and the copper was recovered by precipitation. The leaching of old dumps in New Mexico was continued.

Gold and silver produced at mills in the United States and percentage of gold and silver recovered by smelting and from placers, 1917–1926 [1]

Year	Ore and old tailings treated (short tons)	Bullion recovered from all sources (fine ounces)					
		Amalgamation		Cyanidation		Chlorination	
		Gold	Silver	Gold	Silver	Gold	Silver
1917	11,076,211	828,681	288,791	1,169,478	11,535,747	9,102	283
1918	8,524,496	678,359	216,670	1,047,186	9,736,605	5,770	3,631
1919	8,668,507	839,761	279,793	685,330	7,163,726	--------	--------
1920	7,560,043	679,409	228,807	580,205	7,582,358	--------	--------
1921	7,429,125	765,397	207,877	559,352	7,414,275	--------	--------
1922	7,442,998	812,396	183,119	541,318	8,803,787	--------	--------
1923	7,657,613	683,274	179,527	607,415	10,044,388	--------	--------
1924	8,023,899	746,777	231,742	563,208	8,921,688	--------	--------
1925	8,022,807	753,313	214,790	476,599	6,360,571	--------	--------
1926	7,948,788	682,345	184,640	455,640	5,173,664	--------	--------

Year	Percentage of gold and silver from all sources									
	Amalgamation		Cyanidation		Chlorination		Placers		Smelting [2]	
	Gold	Silver	Gold	Silver	Gold	Silver	Gold	Silver	Gold	Silver
1917	20.9	0.4	29.5	16.3	0.2	--------	25.8	0.2	23.6	83.1
1918	20.7	.3	32.0	14.3	.2	--------	23.6	.13	23.5	85.3
1919	31.5	.5	28.5	13.8	--------	--------	25.6	.15	14.4	85.5
1920	28.5	.4	24.3	13.4	--------	--------	25.3	.13	21.9	86.1
1921	32.6	.45	23.9	16.0	--------	--------	28.9	.18	14.6	83.4
1922	35.4	.3	23.6	14.4	--------	--------	23.5	.1	17.5	85.2
1923	28.4	.3	25.3	14.3	--------	--------	22.9	.1	23.4	85.3
1924	30.6	.4	23.0	13.9	--------	--------	18.4	.1	28.0	85.6
1925	32.6	.3	20.7	9.5	--------	--------	18.9	.1	27.8	90.1
1926	30.6	.3	20.4	8.3	--------	--------	20.5	.1	28.5	91.3

[1] Philippine Islands and Porto Rico excluded.

[2] Both crude ores and concentrates.

About 20 per cent of the total gold output in 1926 came from placers; the percentage of the output of silver credited to the placers was insignificant. Arizona, California, Colorado, Nevada, and South Dakota ores yielded the larger part of the gold recovered by cyanidation; the decrease in total quantity of gold recovered by cyanidation was due mainly to the large declines in California, Nevada, New Mexico, and Oregon. The largest decreases in gold recovered by amalgamation were in Alaska, California, Colorado, Nevada, New Mexico, South Dakota, and Washington. The chlorination process has not been used in California since 1918.

GOLD AND SILVER PRODUCED AT MILLS, BY STATES

A large quantity of concentrates from sulphide ores is now smelted and the moderately increased application of the flotation process has resulted in decreased yield of gold and silver from cyanidation, as nearly all such concentrates are shipped to smelters.

The smelters are credited in 1926 with 28.5 per cent of the total output of gold and 91.3 per cent of the silver. In 1919 the proportion of gold recovered by smelters was only about half that so recovered in 1926.

The bulk of the gold produced continues to come from the gold mills, although the proportion of gold so recovered in 1926 was only 51 per cent of the total, compared with 60 per cent in 1919.

Gold and silver bullion produced at mills in 1926, by States [1]

State or Territory	Ore, old tailings, etc., treated (short tons)	Bullion recovered from all sources (fine ounces)				Percentage of gold and silver from all sources in State			
		Amalgamation		Cyanidation		Amalgamation		Cyanidation	
		Gold	Silver	Gold	Silver	Gold	Silver	Gold	Silver
Alaska	[2] 3,924,794	134, 873	57, 111	2, 200	600	41. 6	8. 3	0. 7	0. 1
Arizona	98, 695	1, 521	1, 026	37, 767	50, 014	. 6	-------	16. 1	. 7
California	[2] 677, 395	241, 248	47, 785	55, 678	308, 567	41. 8	2. 4	9. 7	15. 3
Colorado	[3] 958, 924	95, 055	19, 671	151, 572	21, 662	27. 8	. 4	44. 3	. 5
Idaho	4, 544	2, 030	925	-------	-------	14. 9	-------	-------	-------
Montana	63, 400	7, 170	3, 265	5, 479	61, 534	11. 9	-------	9. 1	. 5
Nevada	748, 960	9, 297	6, 328	109, 125	4, 269, 460	5. 3	. 1	62. 2	65. 5
New Mexico	2, 348	830	700	148	6, 759	4. 2	. 2	. 8	1. 5
Oregon	15, 565	3, 105	522	1, 093	3, 991	23. 4	1. 8	8. 3	13. 4
South Dakota	[4] 1,415, 785	187, 120	47, 284	92, 403	34, 902	66. 9	57. 5	33. 0	42. 5
Texas	33, 818	-------	-------	98	416, 171	-------	-------	89. 1	93. 1
Eastern States	4, 560	96	23	77	4	13. 8	-------	11. 1	-------
	7, 948, 788	682, 345	184, 640	455, 640	5, 173, 664	30. 6	. 3	20. 4	8. 3
Value	-------	$14, 105, 323	$115, 215	$9, 418, 915	$3, 228, 366	-------	-------	-------	-------
1925:									
Total	8, 022, 807	753, 313	214, 790	476, 599	6, 360, 571	32. 6	. 3	20. 7	9. 5
Value	-------	$15, 572, 382	$149, 064	$9, 852, 176	$4, 414, 236	-------	-------	-------	-------

[1] Philippine Islands excluded.

[2] Also concentrates treated in gold and silver mills; metal content included under "Bullion recovered from all sources." For details see p. 704.

[3] Also 304,969 tons of sands and slimes from ore and concentrates amalgamated were treated by cyanidation.

[4] Also 1,402,472 tons of sands and slimes from ore amalgamated were treated by cyanidation.

The great bulk of the ore treated in gold and silver mills was from Alaska, South Dakota, Colorado, Nevada, and California, and here the famous mines and mills of the Homestake, Mother Lode, Grass Valley, Treadwell, Cripple Creek, Tonopah, and Goldfield districts are especially noteworthy. Large numbers of smaller mills, however, mark the wide distribution of gold mining in these regions and in many other scattered districts.

The total yield of gold by amalgamation in the United States in 1926 was 437,999 ounces less than in 1911, the first year for which figures are available. The only increases in 1926 over 1925 were in Arizona and Montana; the largest decreases were: Alaska, 9,960 ounces; California, 36,870 ounces; Colorado, 5,200 ounces; South Dakota, 8,745 ounces; and Washington, 4,394 ounces.

The output of gold by cyanidation was 988,437 ounces less than in 1915, the year of largest recorded output. The only increases in 1926 over 1925 were in Alaska, Arizona, and Texas; the principal decreases were in California, 5,727 ounces; Nevada, 13,080 ounces; New Mexico, 7,485 ounces; and Oregon, 2,773 ounces. Nevada continued to lead in yield of silver by cyanidation, producing 83 per cent of the total but falling off 803,965 ounces in output; the only notable gains in 1926 were in Arizona and California.

Alaska, California, Idaho, Montana, New Mexico, Oregon, and South Dakota yielded more gold by amalgamation than by cyanidation, but cyanidation produced more gold than amalgamation in Arizona, Colorado, and Nevada, and it produced more silver in Arizona, California, Colorado, Montana, Nevada, New Mexico, Oregon, and Texas. Only in Alaska, Idaho, and South Dakota did the recovery of silver by amalgamation exceed that by cyanidation. In 1926 amalgamation produced gold and silver valued together at $14,220,538, compared with $12,647,281 produced by cyanidation.

QUICKSILVER AND POTASSIUM AND SODIUM CYANIDE USED

Figures showing the total quantities of quicksilver and cyanide used in the recovery of gold and silver in the United States in 1926 are not available. For details of the use of quicksilver in the amalgamation milling process and of potassium cyanide and sodium cyanide in the cyanidation process the reader is referred to the mine reports for the several Western States.

A considerable quantity of quicksilver was used at gold dredges in Alaska, California, Oregon, and other States, and the following quantities of quicksilver were purchased for use at gold and silver mills in the States for which figures are available: Colorado, 3,690 pounds; New Mexico, 175 pounds; South Dakota, 5,625 pounds; Arizona, 125 pounds; Idaho, 313 pounds; Montana, 375 pounds; and Nevada, 550 pounds.

Considerable cyanide is used at flotation mills as well as at gold and silver mills. Cyanide used at gold and silver mills in 1926 was mainly sodium cyanide; some cyanamid and a little potassium cyanide were also used. Reduced to the equivalent of 96 to 98 per cent NaCN, the use at mines in the States for which figures are available was as follows: Arizona, 90,315 pounds; Colorado, 258,327 pounds; Montana, 43,000 pounds; Nevada, 1,787,957 pounds; New Mexico, 1,125 pounds; South Dakota, 299,672 pounds. The following table gives details of the use of cyanide in six of the Western States during the last five years:

Potassium and sodium cyanide consumed at mills in six Western States, 1922–1926

State and year	Number of mills using cyanidation process	Ore and old tailings treated (short tons)	Cyanide consumed (pounds) [1]		
			Total	Per ton of ore and old tailings	Per ounce of gold and silver
Arizona:					
1922	12	188, 879	263, 056	1. 39	1. 04
1923	10	242, 652	330, 666	1. 36	. 85
1924	7	146, 904	135, 971	. 93	1. 05
1925	6	59, 840	84, 600	1. 41	1. 66
1926	10	96, 545	90, 315	. 94	1. 03
Idaho:					
1922	3	139	5, 501		1. 68
1923	3	784	3, 900	4. 97	5. 30
1924	3	336	950	2. 83	1. 05
1925	1	1, 377	3, 900	2. 83	3. 96
1926					
Montana:					
1922	14	113, 687	292, 940	2. 58	2. 59
1923	10	151, 903	274, 218	1. 80	2. 10
1924	9	39, 776	84, 770	2. 13	. 77
1925	6	42, 572	54, 684	1. 28	. 57
1926	6	22, 205	43, 000	1. 94	. 64
Nevada:					
1922	28	833, 025	1, 831, 822	2. 20	. 24
1923	32	1, 246, 003	3, 200, 209	2. 57	. 375
1924	25	965, 995	2, 703, 706	2. 80	. 36
1925	16	801, 141	2, 123, 687	2. 65	. 41
1926	15	717, 582	1, 787, 957	2. 49	. 41
Utah:					
1922	1	33, 247	118, 103	3. 55	1. 25
1923	1	14, 301	43, 731	3. 06	1. 06
1924			(2)		
1925–26					
Washington:					
1922	1	241	1, 000	4. 15	. 34
1923	1	12	50	4. 17	6. 25
1924–1926					

[1] Partly estimated. [2] Quantity small; figures not available.

ACKNOWLEDGMENTS

To those engaged in the mining and metallurgic industries, to merchants, bankers, and transportation officials of the United States and Alaska, to the Bureau of the Mint, the Post Office Department, and the Bureau of Foreign and Domestic Commerce, and to other officials, public and private, who have cooperated with the Bureau of Mines by furnishing information on the production of gold and silver, acknowledgment is gratefully made. To the authors of the mine reports on the production of gold silver, copper, lead, and zinc in the Western States the writer is especially indebted.

GOLD, SILVER, COPPER, LEAD, AND ZINC IN NEW MEXICO[1]

(MINE REPORT)

By Chas. W. Henderson

SUMMARY

The total calculated gross value of the recoverable gold, silver, copper, lead, and zinc from ore and gravel produced in New Mexico in 1926 was $14,481,808, compared with $13,875,960 in 1925—an increase of $605,848, or 4 per cent. In 1926 there were 128 producing mines, of which 116 were lode and 12 were placers—the same number of placers as in 1925 but an increase of 24 in the number of lode mines.

The prices given in the table that follows are those at which the values for metals in this report have been calculated. The silver prices for 1917 and 1919 are dealers' buying price, New York; for 1918, average price as stated by the Bureau of the Mint; for 1920 to 1922, New York market price for domestic silver only; for 1923, average price under the Pittman Act, from January 1 to June 2, for domestic silver, and average New York price for all silver after that period; for 1924 and later years, average New York price for bar silver. The copper, lead, and zinc prices are weighted averages, for each year, of all grades of primary metal sold by producers.

Prices of silver, copper, lead, and zinc, 1917–1926

Year	Silver	Copper	Lead	Zinc	Year	Silver	Copper	Lead	Zinc
	Per fine ounce	*Per pound*	*Per pound*	*Per pound*		*Per fine ounce*	*Per pound*	*Per pound*	*Per pound*
1917	$0.824	$0.273	$0.086	$0.102	1922	$1.00	$0.135	$0.055	$0.057
1918	1.00	.247	.071	.091	1923	.82	.147	.070	.068
1919	1.12	.186	.053	.073	1924	.67	.131	.080	.065
1920	1.09	.184	.080	.081	1925	.694	.142	.087	.076
1921	1.00	.129	.045	.050	1926	.624	.140	.080	.075

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[1] For reports on geology and descriptions of mines see Lindgren, Waldemar, Graton, L. C., and Gordon, C. H., The Ore Deposits of New Mexico: U. S. Geol. Survey Prof. Paper 68, 1910; also, Finlay, J. R., Report of Appraisal of Mining Properties of New Mexico to Tax Commissioners, Santa Fe, N. Mex., 1921–22. Comparative statistics for the years 1904 to 1922 were published in Mineral Resources for 1922.

Mine production of gold, silver, copper, lead, and zinc in New Mexico, 1917–1926, in terms of recovered metals

Year	Mines producing			Ore (short tons)	Gold (lode and placer)		Silver (lode and placer)	
	Lode	Placer	Total		Fine ounces	Value	Fine ounces	Value
1917	177	15	192	4, 576, 827	51, 478. 64	$1, 064, 158	1, 394, 365	$1, 148, 957
1918	119	9	128	4, 749, 784	33, 030. 02	682, 791	782, 421	782, 421
1919	86	6	92	2, 155, 998	31, 717. 36	655, 656	837, 418	937, 908
1920	93	6	99	2, 250, 718	23, 234. 61	480, 302	768, 042	837, 166
1921	40	9	49	611, 576	9, 521. 26	196, 822	571, 899	571, 899
1922	74	17	91	1, 576, 920	19, 964. 02	412, 693	752, 240	752, 240
1923	104	16	120	3, 111, 050	26, 689. 12	551, 713	747, 127	612, 644
1924	86	10	96	3, 040, 652	24, 803. 56	512, 735	795, 070	532, 697
1925	92	12	104	3, 358, 566	26, 561. 40	549, 073	735, 124	510, 176
1926	116	12	128	3, 825, 894	19, 630. 72	405, 803	450, 934	281, 383

Year	Copper		Lead		Zinc		Total value
	Pounds	Value	Pounds	Value	Pounds	Value	
1917	105, 568, 000	$28, 820, 064	9, 108, 804	$783, 357	30, 200, 000	$3, 080, 400	$34, 896, 936
1918	98, 264, 563	24, 271, 347	8, 398, 239	596, 275	24, 050, 324	2, 188, 579	28, 521, 413
1919	51, 150, 541	9, 514, 000	2, 886, 513	152, 985	7, 594, 644	554, 409	11, 814, 958
1920	54, 400, 691	10, 009, 727	2, 869, 525	229, 562	10, 013, 580	811, 100	12, 367, 857
1921	14, 267, 338	1, 840, 487	678, 601	30, 537	228, 000	11, 400	2, 651, 145
1922	31, 937, 207	4, 311, 523	3, 012, 223	165, 672	4, 496, 806	256, 318	5, 898, 446
1923	61, 356, 802	9, 019, 450	3, 832, 427	268, 270	16, 496, 000	1, 121, 728	11, 573, 805
1924	74, 691, 436	9, 784, 578	3, 634, 511	290, 761	20, 759, 200	1, 349, 348	12, 470, 119
1925	76, 427, 825	10, 852, 751	6, 420, 060	558, 545	18, 492, 300	1, 405, 415	13, 875, 960
1926	[1] 81, 642, 379	11, 429, 933	[1] 6, 960, 366	556, 829	[1] 24, 104, 800	1, 807, 860	14, 481, 808

[1] Gross metal content of smelting ore and concentrates in 1926 was as follows: Copper, 85,100,019 pounds; lead, 8,111,671 pounds; zinc, 29,768,732 pounds.

Gold and silver produced at placer mines in New Mexico, 1917–1926

Year	Gold		Silver		Total value
	Fine ounces	Value	Fine ounces	Value	
1917	589. 16	$12, 179	92	$76	$12, 255
1918	150. 83	3, 118	21	21	3, 139
1919	239. 89	4, 959	33	37	4, 996
1920	105. 84	2, 188	20	22	2, 210
1921	400. 59	8, 281	61	61	8, 342
1922	190. 21	3, 932	39	39	3, 971
1923	204. 05	4, 218	30	24	4, 242
1924	176. 04	3, 639	27	18	3, 657
1925	97. 62	2, 018	13	9	2, 027
1926	129. 98	2, 687	45	28	2, 715

GOLD

The mine production of recoverable gold in New Mexico in 1926 amounted to 19,630.72 fine ounces, valued at $405,803, compared with 26,561.40 fine ounces, valued at $549,073, in 1925. Hidalgo County produced 59.7 per cent of the total for the State, Grant 28.7 per cent, Colfax 5.1 per cent, Catron 3.1 per cent, and Santa Fe 2.1 per cent. Copper ore yielded 89.2 per cent of the total and dry and siliceous ore 7.3 per cent.

SILVER

The mine production of recoverable silver in New Mexico in 1926 amounted to 450,934 fine ounces, valued at $281,383, compared with 735,124 fine ounces, valued at $510,176, in 1925. Hidalgo County produced 30 per cent of the total for the State, chiefly from the copper ores of the Lordsburg district; Grant County 26.3 per cent, chiefly from the Central district; Sierra County 23.9 per cent, chiefly from the Lake Valley district; Sante Fe County 8.6 per cent, chiefly from the San Pedro (New Placers) district; and Catron County 6.3 per cent, chiefly from the siliceous ore of the Mogollon district. Copper ore yielded 36.5 per cent of the total, chiefly from Hidalgo and Grant Counties; dry and siliceous ore yielded 31.7 per cent, chiefly from Sierra, Hidalgo, and Catron Counties; and lead ore yielded 17.8 per cent, chiefly from Grant, Hidalgo, and Socorro Counties. Placer mines yielded 45 ounces of silver in 1926.

COPPER

The mine production of recoverable copper in New Mexico in 1926 amounted to 81,642,379 pounds, valued at $11,429,933, compared with 76,427,825 pounds, valued at $10,852,751, in 1925. Of the total in 1926, 98.8 per cent was produced in Grant and Hidalgo Counties, chiefly from the operations of the Chino mines in the Central district and of the Eighty-Five mine in the Lordsburg district. Copper ore yielded 99.5 per cent of the total.

LEAD

The mine production of recoverable lead in New Mexico in 1926 amounted to 6,960,366 pounds, valued at $556,829. The chief lead-producing districts were the Central, Grant County; the Magdalena, Socorro County; the San Pedro (New Placers), Santa Fe County; and the Steins, Hidalgo County. Lead ore yielded 66.3 per cent of the output and lead-zinc ore 27.2 per cent.

ZINC

The mine production of recoverable zinc in New Mexico in 1926 amounted to 24,104,800 pounds, valued at $1,807,860. The chief zinc-producing districts were the Central (Hanover), Grant County, and the Magdalena (Kelly), Socorro County, with an important new production from the San Pedro district, Santa Fe County.

Mine production of gold, silver, copper, lead, and zinc in New Mexico in 1926, by counties, in terms of recovered metals

County	Mines producing			Gold (lode and placer)		Silver (lode and placer)	
	Lode	Placer	Total	Fine ounces	Value	Fine ounces	Value
Catron	2	--------	2	601.98	$12,444	28,404	$17,724
Colfax	4	8	12	996.47	20,599	175	109
Dona Ana	4	--------	4	5.03	104	5,131	3,202
Eddy	2	--------	2	--------	--------	3	2
Grant	49	2	51	5,636.90	116,525	118,485	73,935
Guadalupe	1	--------	1	--------	--------	--------	--------
Hidalgo	14	--------	14	11,715.60	242,183	135,505	84,555
Luna	9	--------	9	7.20	149	1,984	1,238
Sandoval	1	--------	1	--------	--------	37	23
Santa Fe	6	2	8	416.08	8,601	38,662	24,125
Sierra	18	--------	18	222.14	4,592	107,973	67,375
Socorro	6	--------	6	29.32	606	14,575	9,095
	116	12	128	19,630.72	405,803	450,934	281,383

County	Copper		Lead		Zinc		Total value
	Pounds	Value	Pounds	Value	Pounds	Value	
Catron	24,400	$3,416	--------	--------	--------	--------	$33,584
Colfax	250	35	--------	--------	--------	--------	20,743
Dona Ana	12,377	1,733	235,200	$18,816	--------	--------	23,855
Eddy	2,400	336	--------	--------	--------	--------	338
Grant	75,909,600	10,627,344	3,122,300	249,784	14,767,000	$1,107,525	12,175,113
Guadalupe	664,236	92,993	--------	--------	--------	--------	92,993
Hidalgo	4,773,072	668,230	642,200	51,376	--------	--------	1,046,344
Luna	2,450	343	183,300	14,664	70,000	5,250	21,644
Sandoval	2,400	336	700	56	--------	--------	415
Santa Fe	177,800	24,892	1,077,666	86,213	1,234,000	92,550	236,381
Sierra	16,680	2,335	298,800	23,904	20,500	1,538	99,744
Socorro	56,714	7,940	1,400,200	112,016	8,013,300	600,997	730,654
	81,642,379	11,429,933	6,960,366	556,829	24,104,800	1,807,860	14,481,808

Gold and silver produced at lode and placer mines in New Mexico in 1926, by counties

County	Lode mines					Placer mines				Grand total value
	Ore sold or treated	Gold	Silver		Total value	Gold	Silver		Total value	
	Short tons		*Fine ounces*				*Fine ounces*			
Catron	976	$12,444	28,404	$17,724	$30,168	------	------	------	------	$30,168
Colfax	1,572	18,748	165	103	18,851	$1,851	10	$6	$1,857	20,708
Dona Ana	2,462	104	5,131	3,202	3,306	------	------	------	------	3,306
Eddy	33	------	3	2	2	------	------	------	------	2
Grant	3,642,883	115,886	118,476	73,929	189,815	639	9	6	645	190,460
Guadalupe	6,642	------	------	------	------	------	------	------	------	------
Hidalgo	99,333	242,183	135,505	84,555	326,738	------	------	------	------	326,738
Luna	1,148	149	1,984	1,238	1,387	------	------	------	------	1,387
Sandoval	14	------	37	23	23	------	------	------	------	23
Santa Fe	7,759	8,404	38,636	24,109	32,513	197	26	16	213	32,726
Sierra	19,658	4,592	107,973	67,375	71,967	------	------	------	------	71,967
Socorro	43,414	606	14,575	9,095	9,701	------	------	------	------	9,701
	3,825,894	403,116	450,889	281,355	684,471	2,687	45	28	2,715	687,186
Total, 1925	3,358,566	547,055	735,111	510,167	1,057,222	2,018	13	9	2,027	1,059,249

Gold and silver produced at placer mines in New Mexico in 1926, by counties

County	Gold		Silver		Total value
	Fine ounces	Value	Fine ounces	Value	
Colfax	89.53	$1,851	10	$6	$1,857
Grant	30.92	639	9	6	645
Santa Fe	9.53	197	26	16	213
	129.98	2,687	45	28	2,715

MINING INDUSTRY

The chief features of metal production in New Mexico in 1926 were: An increase over 1925 of 24 producing lode mines; an increase of 4 per cent in total gross calculated value; a decrease of 6,930.68 ounces of gold and 284,190 ounces of silver, owing to the closing in January, 1926, of operations in the Mogollon district; an increase of 5,214,554 pounds of copper, mainly attributable to an increase in ore treated at Hurley (from the Santa Rita mines) from 3,002,700 tons in 1925 to 3,523,319 tons in 1926; a slight increase in quantity of lead produced but a decrease in value; and an increase of 5,612,500 pounds of zinc, owing to the renewal of milling operations at the Ozark mill at Kelly, with zinc concentrates exported to Belgium, and the entering of new production from San Pedro.

Other features were: The purchase of the Santa Rita mines (or Chino division) of the Ray Consolidated Copper Co. by the Nevada Consolidated Copper Co. in May, 1926, and the development work in connection with the plan for underground mining at the Estrella ore body of the Chino mines in contrast with the present surface steam and electric shovel mining for all ore bodies; the greatly increased shipments of iron-manganese ore from Chloride Flat; the continuation of the production of molybdenum concentrates by flotation above Questa on Red River; the treatment of lead-zinc ores at Hachita by flotation; the continuation of magnetic separation of zinc ores at Hanover; the continued shipments of iron ore from Fierro; the continuation of shipments from the newly opened (1925) copper deposits in the "Red Beds" at Pastura; the new milling operations at Pinos Altos; the continuation of leaching of a dump and underground development at Tyrone and the proposal to leach the present underground ore reserves; the continuation at about the same rate of shipments of siliceous gold-silver-copper ore from Lordsburg; the shipments of lead-silver ore from Steins; the blocking out of zinc-lead-copper-gold-silver ore bodies at the Pecos mine, San Miguel County, for which a 600-ton selective flotation mill was built at Glorieta; the shipments of copper-gold ore from north of Cerrillos, Santa Fe County; the shipments of silver-manganese-iron flux from Lake Valley, Sierra County; and the reopening of the Anniversary mine in the Macho district, Sierra County.

ORE CLASSIFICATION

Ore sold or treated in New Mexico, 1917–1926, with content in terms of recovered metals

Year	Ore	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
DRY AND SILICEOUS ORE						
1917	221, 662	39, 496. 71	966, 006	3, 566, 170	210, 861	
1918	87, 214	20, 621. 04	377, 855	508, 438	1, 865	
1919	90, 713	19, 722. 06	540, 734	45, 054	65, 199	
1920	101, 887	16, 628. 18	608, 657	1, 829, 731	93, 063	
1921	74, 738	8, 389. 83	487, 403	580, 450	61, 960	
1922	78, 127	12, 856. 99	614, 811	33, 476	643, 493	
1923	66, 842	12, 512. 96	544, 607	93, 269	104, 355	
1924	76, 176	11, 872. 65	626, 072	83, 932	1, 682	
1925	58, 862	10, 598. 26	476, 904	62, 940	5, 150	
1926	25, 876	1, 428. 68	142, 735	24, 735	205, 000	
COPPER ORE						
1917	4, 188, 027	10, 876. 11	315, 877	101, 280, 755	92, 673	
1918	4, 516, 407	11, 698. 51	251, 329	97, 101, 342	124, 423	
1919	2, 027, 107	11, 295. 02	238, 271	50, 998, 068	16, 167	
1920	2, 030, 711	5, 992. 17	104, 814	52, 462, 145	67, 541	
1921	533, 231	630. 01	24, 489	13, 637, 034		
1922	1, 477, 166	6, 805. 80	111, 624	31, 669, 547		
1923	2, 946, 800	13, 850. 90	164, 699	61, 179, 811	22, 010	
1924	2, 832, 901	12, 625. 60	131, 743	74, 494, 746		
1925	3, 172, 291	15, 636. 14	163, 561	76, 101, 442	90, 130	
1926	3, 644, 936	17, 509. 81	164, 460	81, 242, 662	37, 868	
COPPER-LEAD ORE						
1917	3, 684	88. 74	29, 600	482, 372	690, 320	
1918	4, 072	96. 20	36, 317	533, 259	934, 448	
1919	320	14. 80	6, 117	38, 433	182, 485	
1920	294	9. 92	5, 655	29, 289	52, 189	
1921	378		2, 552	49, 240	155, 222	
1922	1, 893		11, 015	213, 072	700, 072	
1923	571		2, 976	36, 169	232, 357	
1924	507	15. 23	3, 995	39, 713	130, 659	
1925	327	1. 79	2, 210	41, 500	116, 600	
1926	5		84	250	2, 500	
LEAD ORE						
1917	17, 426	367. 20	70, 021	195, 950	5, 635, 818	
1918	17, 945	459. 44	116, 473	120, 714	6, 196, 976	
1919	6, 904	445. 59	52, 263	68, 986	2, 368, 662	
1920	6, 931	347. 23	47, 140	77, 535	2, 240, 182	
1921	2, 514	100. 83	57, 394	614	417, 419	
1922	3, 038	111. 02	14, 751	21, 112	957, 508	
1923	6, 675	121. 21	34, 815	47, 553	2, 598, 665	
1924	8, 017	114. 04	33, 233	73, 045	2, 524, 195	
1925	17, 239	156. 89	84, 976	219, 173	5, 090, 580	
1926	22, 508	209. 17	80, 127	361, 282	4, 611, 698	
LEAD-ZINC ORE AND ZINC ORE						
1917	146, 028	60. 72	12, 769	42, 753	2, 479, 132	30, 200, 000
1918	124, 146	4. 00	426	810	1, 140, 527	24, 050, 324
1919	30, 954				254, 000	7, 594, 644
1920	50, 895	151. 27	1, 756	1, 991	416, 550	10, 013, 580
1921	715				44, 000	228, 000
1922	16, 696				711, 150	4, 496, 806
1923	90, 162				875, 040	16, 496, 000
1924	123, 051				977, 975	20, 759, 200
1925	109, 847	70. 70	7, 460	2, 770	1, 117, 600	18, 492, 300
1926	132, 569	353. 08	63, 483	13, 450	2, 103, 300	24, 104, 800

Ore sold or treated in New Mexico in 1926, with content in terms of recovered metals

Source	Ore	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Dry gold ore	1,660	980.88	299	710		
Dry gold and silver ore	2,022	392.66	18,467	7,000	31,900	
Dry silver ore	22,194	55.14	123,969	17,025	173,100	
	25,876	1,428.68	142,735	24,735	205,000	
Copper ore	3,644,936	17,509.81	164,460	81,242,662	37,868	
Copper-lead ore	5		84	250	2,500	
Lead ore	22,508	209.17	80,127	361,282	4,611,698	
Lead-zinc ore	17,160	343.18	59,375	8,050	1,892,700	3,123,500
Zinc ore	115,409	9.90	4,108	5,400	210,600	20,981,300
	3,800,018	18,072.06	308,154	81,617,644	6,755,366	24,104,800
Total, lode mines	3,825,894	19,500.74	450,889	81,642,379	6,960,366	24,104,800
Total, placers		129.98	45			
	3,825,894	19,630.72	450,934	81,642,379	6,960,366	24,104,800

Ore sold or treated in New Mexico in 1926, by counties, with content in terms of recovered metals

DRY GOLD ORE

County	Ore	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Colfax	1,572	906.94	165	250		
Grant	42	15.27	58			
Santa Fe		18.06	1			
Sierra	46	40.61	75	460		
	1,660	980.88	299	710		
Total, 1925	2,232	2,611.87	512	600		

DRY GOLD AND SILVER ORE

Catron	830	319.66	15,625			
Hidalgo	1,192	73.00	2,842	7,000	31,900	
	2,022	392.66	18,467	7,000	31,900	
Total, 1925	52,746	7,982.19	452,310	20,850	2,870	

DRY SILVER ORE

Dona Ana	2,110	3.60	2,818	3,000	141,000	
Grant	474	35.14	9,398	1,100	9,800	
Hidalgo	878	10.70	17,185	10,750	2,600	
Luna	508		210	1,492	16,800	
Sierra	18,158	5.70	94,291	369	400	
Socorro	66		67	314	2,500	
	22,194	55.14	123,969	17,025	173,100	
Total, 1925	3,884	4.20	24,082	41,490	2,280	

COPPER ORE

Catron	146	282.32	12,779	24,400		
Dona Ana	36		10	7,900		
Eddy	33		3	2,400		
Grant	3,541,299	5,230.78	37,152	75,578,013	37,702	
Guadalupe	6,642			664,236		
Hidalgo	95,172	11,585.00	104,993	4,749,400		
Sandoval	7		35	2,400		
Santa Fe	1,218	266.20	2,389	173,000	166	
Sierra	64	145.51	6,006	11,913		
Socorro	319		1,093	29,000		
	3,644,936	17,509.81	164,460	81,242,662	37,868	
Total, 1925	3,172,291	15,636.14	163,561	76,101,442	90,130	

Ore sold or treated in New Mexico in 1926, by counties, with content in terms of recovered metals—Continued

COPPER-LEAD ORE

County	Ore	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Sierra	5		84	250	2,500	
	5		84	250	2,500	
Total, 1925	327	1.79	2,210	41,500	116,600	

LEAD ORE

Dona Ana	316	1.43	2,303	1,477	94,200	
Grant	13,416	74.10	48,348	322,437	2,605,998	
Hidalgo	2,091	46.90	10,485	5,922	607,700	
Luna	482	7.20	1,687	958	104,000	
Sandoval	7		2		700	
Santa Fe	133	29.80	478	4,800	24,500	
Sierra	1,336	30.32	7,517	3,688	286,900	
Socorro	4,727	19.42	9,307	22,000	887,700	
	22,508	209.17	80,127	361,282	4,611,698	
Total, 1925	17,239	156.89	84,976	219,173	5,090,580	

LEAD-ZINC ORE

Grant	7,168	250.69	23,520	8,050	411,200	447,000
Luna	110		87		62,500	42,000
Santa Fe	6,408	92.49	35,768		1,053,000	1,234,000
Sierra	49				9,000	20,500
Socorro	3,425				357,000	1,380,000
	17,160	343.18	59,375	8,050	1,892,700	3,123,500
Total, 1925	12,121	70.70	7,331	2,770	1,079,600	3,159,300

ZINC ORE

Grant	80,484				57,600	14,320,000
Luna	48					28,000
Socorro	34,877	9.90	4,108	5,400	153,000	6,633,300
	115,409	9.90	4,108	5,400	210,600	20,981,300
Total, 1925	97,726		129		38,000	15,333,000

METALLURGIC INDUSTRY

The only smelting plant in the State—the zinc oxide plant at Waldo, near Cerrillos—was idle again in 1926. Ore from New Mexico was sent to the lead and copper plants of the El Paso Smelting Works at El Paso, Tex.; the Copper Queen copper smelter and the Calumet & Arizona copper smelter at Douglas, Ariz.; the Ozark zinc-lead oxide plant of Coffeyville, Kans.; the zinc retort plant at Amarillo, Tex.; and the zinc oxide plant of the Empire Zinc Co., at Canon City, Colo. Small shipments of zinc ores were made to Mineral Point, Wis., and to Depue, Ill.

Mine production of metals in New Mexico in 1926, by methods of recovery

Method of recovery	Material treated	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Ore amalgamated	1,598	830.09	700			
Ore cyanided	750	148.06	6,759			
Concentrates smelted	192,815	5,647.88	83,680	74,046,600	1,683,000	20,947,000
Ore smelted	171,808	12,874.71	359,750	7,595,779	5,277,366	3,157,800
Placer		129.98	45			
		19,630.72	**450,934**	**81,642,379**	**6,960,366**	**24,104,800**

Ore treated by amalgamation and cyanidation and gold and silver contained in bullion in New Mexico in 1926

Process	Ore	Gold	Silver	Quicksilver used	Sodium cyanide used
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*
Amalgamation	1,598	830.09	700	175	
Cyanidation	750	148.06	6,759		[1] 1,125
	2,348	978.15	7,459	175	[1] 1,125

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[1] In terms of 96 to 98 per cent strength.

Mine production of metals from gold and silver mills in New Mexico in 1926, by counties

County	Ore treated	Recovered in bullion		Concentrates and recovered metal		
		Gold	Silver	Concentrates produced	Gold	Silver
	Short tons	*Fine ounces*	*Fine ounces*	*Short tons*	*Fine ounces*	*Fine ounces*
Catron	750	148.06	6,759			
Colfax	1,572	779.34	126	28	127.60	39
Grant	26	23.38	573			
Santa Fe		18.06	1			
Sierra		9.31				
	2,348	978.15	7,459	28	127.60	39
Total, 1925	54,328	10,233.15	439,189	20	267.72	10,967

NOTE.—Average recovery per ton in bullion and concentrates: Gold, 0.471 ounce; silver, 3.193 ounces.

Mine production of metals from concentrating mills in New Mexico in 1926, by counties

County	Ore treated	Concentrates and recovered metal					
		Concentrates produced	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Short tons*	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Dona Ana	2,110	422	3.60	2,818	3,000	141,000	
Grant	3,610,427	183,013	5,424.19	42,545	74,043,350	451,000	14,201,000
Santa Fe	6,408	2,366	92.49	35,768		1,053,000	1,234,000
Socorro	32,793	6,986		2,510		38,000	5,512,000
	3,651,738	192,787	5,520.28	83,641	74,046,350	1,683,000	20,947,000
Total, 1925	3,106,339	167,263	4,518.13	23,277	67,017,408	249,800	15,170,000

Mine production of metals from New Mexico concentrates, 1925–26 [1]

Year	Concentrates	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
1925	167,283	4,785.85	34,244	67,017,408	249,800	15,170,000
1926	192,815	5,647.88	83,680	74,046,600	1,683,000	20,947,000

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[1] For figures by counties see tables above.

Mine production of metals from New Mexico crude ore shipped to smelters in 1926, by counties

County	Ore	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Catron	226	453.92	21,645	24,400	-----------	-----------
Dona Ana	352	1.43	2,313	9,377	94,200	-----------
Eddy	33	-----------	3	2,400	-----------	-----------
Grant	32,430	158.41	75,358	1,866,250	2,671,300	566,000
Guadalupe	6,642	-----------	-----------	664,236	-----------	-----------
Hidalgo	99,333	11,715.60	135,505	4,773,072	642,200	-----------
Luna	1,148	7.20	1,984	2,450	183.300	70,000
Sandoval	14	-----------	37	2,400	700	-----------
Santa Fe	1,351	296.00	2,867	177,800	24,666	-----------
Sierra	19,658	212.83	107,973	16,680	298,800	20,500
Socorro	10,621	29.32	12,065	56,714	1,362,200	2,501,300
	171,808	12,874.71	359,750	7,595,779	5,277,366	3,157,800
Total, 1925	197,899	11,444.78	261,678	9,410,417	6,170,260	3,322,300

REVIEW BY COUNTIES AND DISTRICTS

CATRON COUNTY

Mogollon district.—The mine production of the Mogollon or Cooney district in 1926 was 976 tons of ore, yielding $12,444 in gold, 28,404 ounces of silver, and 24,400 pounds of copper, with a gross calculated total value of $33,584, as compared with 52,118 tons of ore, yielding $163,322 in gold and 449,699 ounces of silver, valued together at $475,413, in 1925. The Mogollon Mines Co., operating the Fanney group and the Fanney 200-ton cyanidation mill, ran the mine and mill a few days in 1926 before final closing and cleaning up. During 1926 various small lots of clean-up material carrying gold and silver were shipped from the Last Chance and Fanney mines and mills to the El Paso smelter. This closes, for a period at least, the Last Chance-Top-Confidence-Fanney-Alberta-Johnson group, from which production has been very nearly continuous since 1885. Through 1926 the district produced in all about $19,500,000, practically all gold and silver, with copper as a very minor product. The experience and information gained by the operation of these mines, 75 miles by the only available highway from the most accessible railroad station, Silver City, have contributed to the science of concentration with cyanidation of the concentrates, to the use of De La Vergne oil engines for power, and to other details of operation exigent to mining in remote regions.[2] In 1926 development work was done at the Deadwood-Sunburst group.

COLFAX COUNTY

Mount Baldy district (Elizabethtown, Baldy, Therma).—The mine production of the Elizabethtown district in 1926 was 1,572 tons of ore, $20,599 in gold ($1,851 from placers), 175 ounces of silver, and 250 pounds of copper, valued together at $20,743, as compared with 2,000 tons of ore, $52,658 in gold ($970 from placers), and 432 ounces of silver, valued together at $52,958, in 1925. During January, 1926, the Aztec mine[3] was worked by the Rosita Gold Mining Co., which operated the amalgamation-concentration mill on ore from pillars and stope filling. After February 1 the mine was again under the management of the owners, the Maxwell Land Grant Co., which carried on repairs in the mine for the greater part of the year, added flotation machines to the mill, and ran the mill for several days in November and December. The product was not sold in 1926. The mill is equipped with 1 Universal crusher, 2 Lane mills, 2 Wilfley tables, 2 J.I.B. flotation machines, and 1 Dorr thickening tank. Small lots of gold specimens were recovered from the French Henry and Red Bandana properties. Eight small sluicing operations on Ute, Moreno, and South Ponil Creeks produced $1,851 in gold.

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[2] For general history and for details of mining see Kidder, S. J., "Mining methods in Mogollon district, New Mexico": Trans. Am. Inst. Min. and Met. Eng., vol. 72, pp. 529-549, 1925; also Scott, D. B., "Ore deposits of the Mogollon district": Trans. Am. Inst. Min. and Met. Eng., vol. 63, pp. 289-310, 1920. For geology see Ferguson, H. G., Geology and Ore Deposits of the Mogollon Mining District, New Mexico: U. S. Geol. Survey Bull. 787, 1927.

[3] See Chase, Charles A., and Muir, Douglas, "The Aztec mine, Baldy, N. Mex.": Trans. Am. Inst. Min. and Met. Eng., vol 68, pp. 270-281, 1923.

DONA ANA COUNTY

Organ district.—Lessees on the Stephenson-Bennett group operated a small jig mill on ore from the old stopes and from the dump, shipping several hundred tons of lead-silver concentrates, and in addition shipped several cars of lead-silver smelting ore. Several cars of lead-silver smelting ore were also shipped from the Hill Top mine. Lessees on other dumps in the district shipped several cars of lead-silver ore.

EDDY COUNTY

A car of copper ore was shipped from Artesia in 1926.

GRANT COUNTY[4]

Burro Mountain district.—Leaching of the dump of the Burro Mountain branch mines of the Phelps Dodge Corporation at Tyrone recovered copper in the form of copper precipitates. This dump, which contains all of the waste material brought out of the mine during the many prior years of development and operation, contains approximately 1,000,000 tons. The sulphides in the dump slowly oxidize to sulphate, and several years ago leaching was started with water pumped from the mine. The quantity of precipitates recovered has declined steadily year by year, and this dump, to which no new material has been added in recent years, is not expected to produce much longer. The 2,000-ton flotation mill on this property remained idle in 1926, but lessees in the mine produced over 1,000 tons of copper smelting ore. The mine is opened by an adit 5,000 feet long and two shafts each 600 feet deep. Underground development work in 1926 at the Rachet shaft and in No. 3 division totaled 5,538 feet, resulting in a substantial increase of ore reserves of satisfactory grade. At the end of 1926 this development work was discontinued, but necessary development work was planned in No. 1 division. In 1927 an appropriation was authorized for investigations in connection with a leaching process for these ores. Laboratory experiments conducted in 1926 toward determining the availability of establishing leaching processes for the treatment of the underground reserves of mixed oxide and sulphide ores indicate that high extraction can be obtained with a ferric iron solvent, but the company feels that these results will have to be confirmed on a test-plant scale before they form a basis for an estimate of construction and operating costs. Several cars of lead-silver smelting ore were shipped from the Woodward property, near Tyrone.

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[4] For a description of the geology of Bear Mountain, Burro Mountain, Chloride Flat, Fierro, Fleming, Georgetown, Hanover, Lone Mountain, Pinos Altos, and Santa Rita see Paige, Sidney, U. S. Geol. Survey Geol. Atlas U. S., Silver City folio (No. 199), 1916.

Central district.—The mine production of the Central district in 1926 was 3,633,821 tons of ore, yielding $109,335 in gold, 86,963 ounces of silver, 75,219,200 pounds of copper, 2,611,100 pounds of lead, and 14,327,000 pounds of zinc, with a gross calculated total value of $11,977,701, as compared with 3,159,167 tons of ore, yielding $97,299 in gold, 76,547 ounces of silver, 68,812,280 pounds of copper, 2,363,260 pounds of lead, and 15,033,000 pounds of zinc, valued in all at $11,269,879, in 1925. The Empire Zinc Co.'s 250-ton magnetic separation mill at Hanover continued to be operated steadily, and the product, a high-grade zinc sulphide concentrate, was sent as usual to the company's zinc oxide plant at Canon City, Colo. Some zinc sulphide and some zinc carbonate ore from this mine were also shipped to the zinc oxide plant at Canon City, and a car of copper oxidized ore was shipped to El Paso. Copper smelting ore was shipped from the Bond-Pewabic, Dewey-Schley, Ground Hog, Hanover-Modoc, Lucky Bill, Rio Grande-San Jose, and Union Hill mines. Lead smelting ore was shipped from the Ground Hog, Humboldt, Lucky Bill, and some small prospects. At one time during the year there were 10 sets of lessees on the Humboldt. Lead ore shipped to smelters in 1926 amounted to 13,056 tons. Copper ore concentrated amounted to 3,523,319 tons, and crude copper ore shipped to smelters amounted to 16,990 tons. With reference to the purchase of the Chino mines in 1926 by the Nevada Consolidated Copper Co., of Nevada, the president in his report, dated March 28, 1927, presented as part of the twentieth annual report of the Nevada Consolidated Copper Co. for the year ended December 31, 1926, says:

> Under date of April 26, 1926, you were informed of a revision of plans theretofore approved, looking to the purchase by your company of the properties and assets of the Ray Consolidated Copper Co., the major items of which were that company's mines and plants in the vicinity of Ray, Arizona, and Santa Rita, New Mexico. Through the above-mentioned notice a meeting of the stockholders of your company was called for May 26, 1926, to pass upon the proposal, which contemplated acquisition of Ray Co.'s properties in their entirety for $46,157,685 principal amount in your company's fifteen-year five per cent debentures. The stockholders' meeting so called was duly held and, the proposal of purchase being approved at that meeting, and the stockholders of the Ray Consolidated Copper Co. having on the same day ratified the proposal to sell its properties to your company, the sale and purchase was immediately consummated and your company thereby became the owner of the Ray Consolidated Copper Co.'s properties.
>
> In addition to the acquisition of the properties above described, negotiations were concluded early this year with the Ray Hercules Mines, Inc., for the purchase of all its properties in Arizona, consisting of mines and mining claims adjoining or adjacent to the Ray Mines, together with all accessories in the way of mining and milling plants and facilities, and title to these properties is now in your company.
>
> The operations of your properties in Nevada, Arizona and New Mexico have since acquisition of Ray Co.'s properties been conducted under unified organization, and the results of your company's operations and business for the year as herein reported include earning and operating statements for the former Ray Consolidated properties as well as your Nevada properties for the full year.
>
> The total income for the year amounted to $9,422,468, approximately $1.86 per share of stock which will be outstanding when the total issue of debentures has been converted. After deducting normal and regular charges for depreciation and for retirement of obsolescent equipment, the net amount credited to

surplus was $7,608,013. Excluding investments in the capital stock of subsidiary and affiliated companies and after cash distributions to stockholders aggregating $4,687,121, the net current assets were increased $1,527,157 over the surplus of current assets at the close of the previous year.

As the result of operations of the three mines for the year, the total output of refined marketable copper amounted to 231,119,539 pounds, the production cost of which, excluding federal income taxes but including all other taxes, all fixed and general expenses and accounting charges for depreciation of plant and equipment, and after crediting the value of precious metals and net miscellaneous earnings, was 10.53 cents per pound, as compared with a cost, similarly calculated for the same mines for 1925, of 11.10 cents per pound.

The report of the general manager for Chino mines, dated March 18, 1927, says:

Exploration and ore reserves.—At Chino mines the drilling campaign for the year was chiefly directed toward ascertaining the extent and limits of the Estrella ore body which will be mined by underground methods; 21,620 feet of prospect drilling was completed and a large tonnage of additional ore disclosed.

Development and improvements at the mines.—At Chino mines the man and material shaft, which will be used in connection with the extraction of the Estrella and other near-by underground ore bodies, had reached a depth of 348 feet at the end of the year. This shaft will be sunk to a total depth of 644 feet and the work of opening up the Estrella ore body for subsequent mining will be carried forward from this shaft. Work on the grade for the necessary diversion of Santa Rita Creek around the outside slope of shovel pits was continued. Fifteen 20-yard dump cars and a ballast or waste spreader were added to the shovel equipment and one shovel was converted from steam to electric. Fifteen new cottages for the accommodation of employees were completed by the end of the year, and a new grade school building, to take the place of the old one located within the shovel mining area, was nearly finished.

Mining operations.—At Chino mines, where all ores are now mined by power shovels, the mining cost for the year exclusive of depreciation and taxes, but including all other expenses of every nature, was 36.4 cents per ton. The cost of stripping at the Chino division for the year was 51.44 cents per cubic yard.

The mining costs stated above do not include the usual charges made as to all mines against each ton of ore produced, to cover prepaid development or stripping expense or both. This charge, for the year under discussion, was * * * 45 cents per ton.

Milling operations.—At Chino mines a total of 3,523,319 dry tons of ore was milled through the Hurley concentrator during the year, equivalent to an average of 9,653 tons a day. The cost of milling, exclusive of depreciation and taxes, but including all other expenses, was 62.6 cents per ton.

Smelting operations.—As to both Ray and Chino mines, the concentrates produced from the mills, and any direct smelting ores obtained from mining operations, are smelted under long time contracts at the plants of the American Smelting & Refining Co. at Hayden, Ariz., and El Paso, Tex., respectively.

Production.—The total quantity of ore produced from the Nevada, Ray, and Chino mines, and treated during the year, was 10,949,544 tons. Of this total, 10,840,648 tons of milling ore, equivalent to a daily average of 29,700 tons, was treated at the concentrators, and 108,896 tons of crude ore was shipped direct to the smelters.

In addition to the company ores, as above stated, 208,143 tons of contract and other custom ores were milled and 10,156 tons smelted at the Nevada plants.

The average grade of all company material milled was 1.268 per cent copper, and the average recovery in the form of concentrates was 86.26 per cent of the total copper contents, corresponding to 21.88 pounds of copper per ton so treated.

The year's total refined marketable production of company copper from both concentrates and direct smelting ores was 231,119,539 pounds.

General.—At Chino mines production requirements will be supplied principally from shovel operations for some years, but underground development has been commenced for the mining of the Estrella and other deep lying ore bodies, the limits of which are not yet fully defined, in order to be prepared for underground mining in the most economic way, well in advance of heavy requirements from that source.

Chloride Flat district.—The output of iron-manganese ore increased greatly in 1926 and was shipped to the Colorado Fuel & Iron Co.'s steel mill, at Pueblo, Colo. Shipments were made from the Stevens' Boston Hill group, Clan-Seven Sisters group, and Silver Spot group.

Eureka district (*see also Hidalgo County*).—The 100-ton gravity concentration-flotation mill on the American mine was operated for several months; the product was lead concentrates and lead-zinc concentrates. This mine is in Grant County, but other operating mines in the Eureka district in 1926 are in Hidalgo County; the district is cut by the county line.

Gold Hill district.—Frank C. Cline alone operated his Roosevelt mine and made two runs of his 2-stamp plate amalgamation mill, shipping gold bars to the Denver mint. A car of silver concentrates was shipped from the Cooperative (Good Luck-Yankee Girl) mill.

Lone Mountain district (*Hurley*).—Several cars of iron-manganese ore were shipped from the Ruby Flat property to the steel mill at Pueblo, Colo.

Pinos Altos district.—The mine production of the Pinos Altos district in 1926 was 3,488 tons of ore, $6,171 in gold (of which $639 was from placers), 4,578 ounces of silver, 8,400 pounds of copper, 152,800 pounds of lead, and 170,000 pounds of zinc, with a gross calculated total value of $35,178, as compared with 407 tons of ore, $624 in gold ($529 from placers), 2,287 ounces of silver, 430 pounds of copper, and 96,550 pounds of lead, valued in all at $10,672, in 1925. At the end of the year the Calumet 60-ton gravity concentration mill was run for 4 months on one 8-hour shift, on ores from the Calumet group and on custom ore from Hanover; the product was lead concentrates and zinc concentrates, both classes carrying also copper, silver, and gold. Development work at this mine in 1926 totaled 320 feet of drifts and 80 feet of crosscuts. The mine is opened by a 125-foot incline shaft and 500 feet of drifts. The Jackson Consolidated Mines Co.'s concentration mill was operated for several months on ore from the Langston mine; the product was lead concentrates and zinc concentrates, both classes carrying gold, silver, and copper. A lessee on the Lead Hill claim shipped 200 tons of lead-silver smelting ore. A car of lead-silver-gold smelting ore was shipped from the East Side claim.

GUADALUPE COUNTY

From the Stauber mine in the "Red Beds" on a patented homestead 2½ miles north of Pastura 6,642 tons of ore assaying 5.1 per cent copper was shipped to the El Paso smelter. This property had no development prior to early in 1925. The development consists of several shafts, each about 27 feet deep, and 1,500 feet of drifts.

HIDALGO COUNTY

Eureka district (*Hachita*) (*see also Grant County*).—Two carloads of smelting ore (one of copper-silver-gold ore and one of lead-silver-copper-gold ore) were shipped from the Cactus group. Assessment work only was done on the Apache group.

Fremont district.—A carload of lead-silver smelting ore was shipped from the Volney group.

Gillespie (*Red Hill*) *district.*—The Red Hill mine, 28 miles southwest of Hachita, from which in the past (including 1925) oxidized silver-lead ore has been shipped, was optioned in 1926 to the Western Development and Exploration Co., which did some development work. Several cars of oxidized silver-lead ore were shipped from this mine in 1926.

Lordsburg district (including Pyramid and Virginia or Shakespeare districts).—The mine production of the Lordsburg district in 1926 was 97,420 tons of ore, yielding $241,954 in gold, 126,909 ounces of silver, 4,762,750 pounds of copper, and 73,400 pounds of lead, with a gross calculated total value of $993,802, as compared with 108,219 tons of ore, yielding $222,823 in gold, 126,781 ounces of silver, 5,064,140 pounds of copper, and 69,700 pounds of lead, valued in all at $1,035,981, in 1925. Shipments were mostly highly siliceous gold-silver-copper ore for Arizona copper refineries. Copper-silver smelting ore and lead-silver-copper-gold smelting ore were shipped from the Anita No. 1 mine. Dry silver smelting ore, carrying less than 1 per cent copper, wet assay, was shipped from the Anita No. 2 mine. Dry silver smelting ore, carrying less than 2 per cent copper and about 1 per cent lead, and lead-silver-copper-gold smelting ore were shipped from the Atwood mine. A car of lead-silver-gold smelting ore was shipped from the Ada Etta mine. Nearly 2,000 tons of smelting ore was shipped from the Bonney mine, the major part being siliceous gold-silver smelting ore and the remainder being siliceous gold-silver ore with nearly 6 per cent, wet assay, copper. Various lessees on the Last Chance mine shipped 500 tons of dry silver smelting ore. The largest producing mine in the district was the Eighty-Five mine, operated by the Calumet & Arizona Mining Co. The annual report for the year ended December 31, 1926, of the Calumet & Arizona Mining Co. (incorporated March, 1901, under the laws of Arizona, and October, 1925, under the laws of Delaware, and including mines at Warren, Ariz., and a custom copper smelter at Douglas, Ariz., equipped with roasters, reverberatory furnaces, converters, Cottrell dust-collecting system, and acid plant) includes the superintendent's report (from which the following are excerpts) of the Eighty-Five branch:

> During the year 1926 a total of 4,958 feet of development work was done, as follows: Drifting 3,285.5 feet, crosscutting 618.5 feet, raising 1,054 feet.
>
> The most important development work was on the 1,500 and 1,650 foot levels. The vein on the 1,500-foot level has been developed 993 feet with values comparable to those of the 1,350 level directly above. The vein on the 1,650-foot level has been developed 561 feet through low grade ore with lenses of better ore.
>
> Considerable work was done on the 450 level. The west drift was advanced 120 feet, disclosing a narrow vein of quartz with diminishing values near the Superior end line. A crosscut was driven northerly parallel to the Superior claim for a distance of 196 feet. The most important work was the development of 200 feet of low grade ore in the 2,000 west drift.
>
> The west drift on the 900-foot level was advanced 82 feet, disclosing a strong vein of high grade ore at its present face.
>
> Ore mined was 101,447 wet tons, equivalent in dry weight to 95,878 tons.
>
> Lessees shipped 1,268 tons of ore, most of which was obtained from old workings on the Emerald and Dundee claims.

Steins district.—Over 1,000 tons of lead smelting ore carrying a few ounces of silver to the ton was shipped from the Carbon Hill mines, and smelting ore carrying between 25 and 30 per cent lead and 12 ounces of silver to the ton was shipped from the Granite Gap mine.

LINCOLN COUNTY

There was no production in 1926 from the Jicarilla, Nogal, Red Cloud (Gallinas Mountains), and Whiteoaks mineral districts of Lincoln County.

LUNA COUNTY

Cooks Peak district.—Several cars of silver-lead ore and lead-zinc ore were shipped from the Desdemona-Othello-Monte Christo group.

Florida Mountains district.—Several cars of lead-silver smelting ore from the Lucky John and other prospects in the Florida Mountains were shipped in 1926.

Tres Hermanas district.—A car of zinc oxidized smelting ore was shipped from the Homestead, and several cars of lead-silver smelting ore from other prospects in the Tres Hermanas district.

Victorio district.—Several cars of lead-silver smelting ore were shipped from the Chance group.

OTERO COUNTY

Orogrande district.—Only assessment work was done in the Orogrande district in 1926.

Sacramento Mountains district (*Alamogordo.*)—In May, 1926, the Federal Mining & Smelting Co., of Baxter Springs, Kans., abandoned its option on the Alamo group, following development work which began in the fall of 1925. The owners of the Alamo did no work in 1926.

SANDOVAL COUNTY

A small lot of copper-silver smelting ore and a small lot of lead-silver smelting ore were shipped from the Sandia Mountains. At the Montezuma group at Placitas 300 feet of development work was done. The total development consists of a 65-foot shaft, an 85-foot shaft, and 400 feet of drifts.

At the Spanish Queen mine in the Jemez mining district near Jemez Springs 1,000 feet of drifts and 500 feet of raises were driven. The property is opened by a 60-foot shaft. A 15-ton Mace furnace was purchased but not installed until 1927.

SAN MIGUEL COUNTY

Early in 1926, the American Metal Co. took over from the Goodrich-Lockhart Co. and continued throughout the year development work on the Pecos mine (variously known since 1878 as the Cowles or Hamilton mine and as the Katydid, Evangeline, and other claims), at the junction of Pecos River and Willow Creek, approximately 12 miles north of Pecos and 16 miles from Glorieta. A 600-ton selective flotation mill was completed on a side hill of a dry creek west of Valley Ranch; water is pumped from the Pecos River over the ridge that separates Pecos River and the dry creek. A tailings dam was built below the mill to insure clean water returning to the Pecos River below Valley Ranch. A 4-mile spur was built from Fox station (near Glorieta) on the Atchison, Topeka, & Santa Fe Railroad to the mill, and a 12-mile aerial tramway was built between the mill and the mine. Milling began January 20, 1927. The development and sampling indicate that the ore will average about 18 per cent zinc, 4 per cent lead, 1 per cent copper, $2 silver, and $2 gold. The ore minerals are sphalerite, galena, chalcopyrite, and pyrite, and the gangue is a sheared micaceous diorite. Mining will be by the cut-and-fill system and square sets.

SANTA FE COUNTY

Cerrillos district.—During the assessment work on the Tom Payne mine 33 tons of lead-silver-gold smelting ore was shipped. At the Evelyn Gold-Copper group 5½ miles north of Cerrillos lessees reopened the 120-foot shaft, drove 100 feet of drifts on the 100-foot level, and shipped several hundred tons of copper-gold ore. The Waldo zinc oxide plant, operated from 1917 to 1923, remained idle.

New Placers district (*Golden, San Pedro*).—The 50-ton selective flotation mill of the Collier Mines Co. (sold to Carnahan Mines Co. late in the year) was operated on the coarsely crystalline complex sphalerite-galena-pyrite ore of the Amazon-Anaconda-Lincoln-Lucky group. The products, a high-grade silver-lead concentrate nearly free of zinc and a zinc concentrate fairly free of lead and silver, were hauled 12 miles to the railroad station at Hagan. Coal from Hagan is used for power at the metal mine. The mine is opened by a 500-foot vertical shaft and 2,000 feet of drifts. In 1926 development totaled 1,000 feet. A single lessee on part of the San Pedro mine shipped 544 tons of copper-silver-gold ore to the El Paso copper smelter. This property, owned by the Santa Fe Gold & Copper Co., consists of 33,479 acres of land, consisting of 279 acres of patented copper claims and 33,000 acres of miscellaneous lands, comprising the San Pedro grant, in Santa Fe, Sandoval, and Bernalillo Counties; also 300 acres of grazing lands, comprising the Canon del Agua grant, in Santa Fe County. When worked by the company, from 1900 to 1917, the copper mine was opened by a 200-foot shaft and a 1,600-foot adit. The smelter at the mine, a 125-ton blast furnace operated from 1901 to 1917 with periods of suspension, was dismantled in 1919. Small lots of specimen gold from the Denton lode and placer bullion from the Cerrillos placer and the Santa Fe placer were marketed in 1926. Development work was done on placer acreage on the Ortiz grant.

SIERRA COUNTY

The mine production of Sierra County in 1926 was 19,658 tons of ore, yielding $4,592 in gold, 107,973 ounces of silver, 16,680 pounds of copper, 298,800 pounds of lead, and 20,500 pounds of zinc, with a gross calculated total value of $99,744, as compared with 2,545 tons of ore, yielding $1,825 in gold, 23,090 ounces of silver, 6,300 pounds of copper, and 38,930 pounds of lead, valued in all at $22,132, in 1925.

Apache, Cuchillo Negro (*Chloride*) *district.*—A car of lead-silver smelting ore from the U. S. Treasury mine, a small lot of dry silver smelting ore from the Bald Eagle, and a small lot of silver-copper-gold smelting ore from the Silver Monument mine were shipped in 1926.

Goldsboro district (*Hot Springs*).—Two small lots of lead-silver smelting ore were shipped from prospects.

Hermosa district.—Several cars of silver-lead smelting ore were shipped from the Dictator mine.

Kingston district.—A car of dry gold ore, a car of lead-silver ore, and a car of zinc-lead ore were shipped to smelters by the Black Range Development Co. A car of dry silver smelting ore from the Lady Franklin and a ton lot from the Overlook mine were shipped to the El Paso smelter. A car of silver-lead smelting ore was shipped from the Illinois-Saratoga group.

Lake Valley district.—The major part of the production of Sierra County in 1926 was made by Everhart and Miller, lessees on the old Lake Valley mine, from January 1 to October 1. The ore shipped was an oxidized iron-manganese-silver-limey fluxing material.

Las Animas district (*Hillsboro*).—Smelting ore shipped from the Las Animas district in 1926 consisted of one car each of copper-gold-silver ore from the Empire and from the Richmond-Mammie group, a small lot of gold ore from the Garfield-Butler group, and a small lot of lead-copper-silver ore from the Wicks dump.

Macho district.—Two sets of lessees, one from January 1 to July 15 and the other from July 15 to December 31, shipped 1,168 tons of lead-silver ore from the Anniversary mine in the Macho district. The ore was hauled 10 miles southeasterly to Nutt Station. The mine is opened by two shafts, one 500 feet deep and one 200 feet deep, connected on the 200-foot level. The first lessee cut a level at 40 feet and drove 75 feet of drifts and cut a level at 80 feet on which he drove 150 feet of drifts. There are 300 feet of drifts on the 200-foot level; the water was pumped out only down to the 200-foot level. The second lessee shipped one car from the mine and the remainder of his shipments from the dump.

Pittsburg district (*Hot Springs*).—A small lot of high-grade silver-copper ore was shipped from the Sweeney prospect.

SOCORRO COUNTY

The gross calculated value of the mine production of metals in Socorro County in 1926 was $730,654, as compared with $484,059 in 1925. The quantity of ore mined in 1926 was 43,414 tons as compared with 12,398 tons in 1925.

Magdalena district (*Kelly*).—The Ozark Smelting & Mining Co.'s 150-ton flotation mill, idle since March, 1921, was set in operation on February 15, 1926, and was operated at about 125 tons daily capacity thereafter on zinc ore from the Waldo mine. The ore into the mill was relatively low grade but at a ratio of 4.7 to 1 made zinc concentrates of 48 per cent grade, which were exported to Belgium. This mine is opened by an 1,800-foot adit, a 500-foot shaft, and 90,000 feet of drifts, of which 600 feet were driven in 1926. In addition to the ore milled, zinc-lead sulphide smelting ore was shipped to the leaded-zinc oxide plant at Coffeyville, Kans., and lead-silver oxidized ore and copper-silver sulphide ore were shipped to the El Paso smelter. Lessees on the Kelly mine of the Empire Zinc Co. shipped lead-silver ore to El Paso. This lessee also operated for a short period his 50-ton gravity concentration mill on lead-silver oxidized ores. J. A. McDonald shipped lead-silver ore to El Paso and zinc-lead sulphide ore to Coffeyville, Kans., from the Juanita mine. Lead-silver ore and lead-zinc ore were shipped from the Mistletoe. R. R. Foster shipped lead-silver ore from the "South Camp" slag dump. Zinc sulphide ore was shipped from the Nitt mine.

TAOS COUNTY

Red River district.—Only assessment and development work were done in the Red River district.

Sulphur Creek district.—Molybdenum ore from the Phyllis group was milled throughout the year at the 20-ton flotation mill at the junction of Sulphur Creek and Red River, above Questa.

VALENCIA COUNTY

It is reported that a fire on January 1, 1926, destroyed the buildings on the Valencia copper property, at Diener.

GOLD, SILVER, COPPER, LEAD, AND ZINC IN TEXAS

(MINE REPORT)

By Chas. W. Henderson

SUMMARY

The mine production of gold, silver, copper, lead, and zinc in Texas during the past 10 years has been as follows:

Mine production of gold, silver, copper, lead, and zinc in Texas, 1917–1926, in terms of recovered metals

Year	Ore (short tons)	Gold	Silver	
			Fine ounces	Value
1917	52,382	$22	595,789	$490,930
1918	50,592	25	576,565	576,565
1919	54,510	25	538,642	603,279
1920	56,269		511,401	557,427
1921	[1] 58,527		516,766	516,766
1922	69,420		644,980	644,980
1923	78,610	802	811,824	665,696
1924	84,744		720,739	482,895
1925	72,737		552,000	383,088
1926	34,042	2,270	447,237	279,076

Year	Copper		Lead		Zinc		Total value
	Pounds	Value	Pounds	Value	Pounds	Value	
1917	23,132	$6,315	2,490	$214	22,676	$2,313	$499,794
1918	9,308	2,299	26,944	1,913			580,802
1919	979	182	13,131	696			604,182
1920	14,435	2,656					560,083
1921							516,766
1922	4,290	579	8,016	441			646,000
1923	4,257	625	26,605	1,862			668,985
1924							482,895
1925			16,000	1,392			384,480
1926	12,620	1,767	83,890	6,711			289,824

[1] Revised figures.

The prices given in the table that follows are those at which the values for metals in this report have been calculated. The silver prices for 1917 and 1919 are dealers' buying price, New York; for 1918, average price as stated by the Bureau of the Mint; for 1920 to 1922, New York market price for domestic silver only; for 1923, average price under the Pittman Act, from January 1 to June 2, for domestic silver, and average New York price for all silver after that period; for 1924 and later years, average New York price for bar silver. The copper, lead, and zinc prices are weighted averages, for each year, of all grades of primary metal sold by producers.

Prices of silver, copper, lead, and zinc, 1917–1926

Year	Silver	Copper	Lead	Zinc
	Per fine ounce	*Per pound*	*Per pound*	*Per pound*
1917	$0.824	$0.273	$0.086	$0.102
1918	1.00	.247	.071	.091
1919	1.12	.186	.053	.073
1920	1.09	.184	.080	.081
1921	1.00	.129	.045	.050
1922	$1.00	$0.135	$0.055	$0.057
1923	.82	.147	.070	.068
1924	.67	.131	.080	.065
1925	.694	.142	.087	.076
1926	.624	.140	.080	.075

REVIEW BY COUNTIES

BURNET COUNTY

Two cars of copper ore were shipped to El Paso by the Burnett Mining Co. at Canyon.

CULBERSON COUNTY

Several cars of silver ore carrying about 2 per cent copper were shipped from the Hazel dump, 14 miles north of Van Horn.

HUDSPETH COUNTY

A small lot of silver-copper ore was shipped by the Mohawk Mining Co. from the Little Lightning mine, 7 miles north of Allamoore.

PRESIDIO COUNTY

Between January 1 and April 16, 1926, the Presidio Mining Co. continued operation of its Presidio mine and 225-ton cyanidation-gravity concentration mill while negotiations were being carried on with the American Metal Co. for lease and option to buy. On April 16 the American Metal Co. took over the operation and continued the mill operations, at the same time doing development work in search of ore. In September the outlook was so disappointing that the mill was closed down, but development work continued with opening of sufficient ore to warrant starting the mill again on February 22, 1927. This mine has been a consistent producer since 1885; it has a 700-foot vertical shaft and 25 miles of drifts and crosscuts, of which 4,800 feet were driven in 1926. The ore is siliceous, and the chief mineral is silver chloride with some patches of galena. The mill is a 225-ton countercurrent cyanidation plant with concentrating tables to take out some of the galena. The equipment consists of two Sturtevant crushers, two Blake crushers, and 15 stamps (1,100 pounds each) for crushing, two 4½ by 18 foot tube mills for fine grinding, classifiers, agitators, filters, and Merrill-Crowe zinc precipitator. The mine has produced the major part of the output of silver in Texas, which from 1885 to 1926 amounted to 18,987,280 ounces, having a commercial value of $13,897,634.

GOLD, SILVER, COPPER, LEAD, AND ZINC IN COLORADO

(MINE REPORT)

By Chas. W. Henderson

SUMMARY

The total calculated gross value of the recovered and estimated recoverable gold, silver, copper, lead, and zinc from gravels handled and ores mined in Colorado in 1926 showed an increase of less than 1 per cent over the gross value in 1925, following an increase in 1925 over 1924 of 12 per cent. There were appreciable increases in 1926 in both quantity and value of copper, lead, and zinc, an increase in quantity but a decrease in value of silver, and a decrease in gold.

The total recorded value of gold, silver, copper, lead, and zinc (in terms of recovered metals) produced from Colorado ores and gravels from 1858 to 1926, inclusive, is $1,591,358,014.[1]

The prices given in the table that follows are those at which the values for metals in this report have been calculated. The silver prices for 1917 and 1919 are dealers' buying price, New York; for 1918, average price as stated by the Bureau of the Mint; for 1920 to 1922, New York market price for domestic silver only; for 1923, average price under the Pittman Act, from January 1 to June 2, for domestic silver, and average New York price for all silver after that period; for 1924 and later years, average New York price for bar silver. The copper, lead, and zinc prices are weighted averages, for each year, of all grades of primary metal sold by producers.

Prices of silver, copper, lead, and zinc, 1917–1926

Year	Silver	Copper	Lead	Zinc	Year	Silver	Copper	Lead	Zinc
	Per fine ounce	*Per pound*	*Per pound*	*Per pound*		*Per fine ounce*	*Per pound*	*Per pound*	*Per pound*
1917	$0.824	$0.273	$0.086	$0.102	1922	$1.00	$0.135	$0.055	$0.057
1918	1.00	.247	.071	.091	1923	.82	.147	.070	.068
1919	1.12	.186	.053	.073	1924	.67	.131	.080	.065
1920	1.09	.184	.080	.081	1925	.694	.142	.087	.076
1921	1.00	.129	.045	.050	1926	.624	.140	.080	.075

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[1] For details 1858 to 1923 see Henderson, Chas. W., Mining in Colorado: U. S. Geol. Survey Prof. Paper 138, 1926, 263 pp.; for recapitulation by years 1858 to 1925 see "Gold, silver, copper, lead, and zinc in Colorado": Mineral Resources of the United States, 1925, pt. 1, opp. p. 701.

Mine production of gold, silver, copper, lead, and zinc in Colorado, 1917–1926

Year	Mines producing			Ore sold or treated (short tons)	Gold			Silver (lode and placer)	
	Lode	Placer	Total		Lode	Placer	Total	Fine ounces	Value
1917	715	33	748	2, 688, 706	$15, 068, 196	$661, 028	$15, 729, 224	7, 304, 353	$6, 018, 787
1918	576	12	588	2, 314, 890	12, 225, 516	526, 202	12, 751, 718	7, 063, 554	7, 063, 554
1919	453	11	464	1, 919, 768	9, 336, 065	550, 562	9, 886, 627	5, 758, 010	6, 448, 971
1920	405	11	416	1, 571, 293	7, 061, 731	514, 588	7, 576, 319	5, 409, 335	5, 896, 175
1921	367	15	382	1, 281, 381	6, 490, 688	344, 640	6, 835, 328	5, 631, 657	5, 631, 657
1922	460	20	480	1, 412, 100	6, 017, 016	356, 403	6, 373, 419	5, 855, 911	5, 855, 911
1923	400	17	417	1, 569, 100	6, 227, 200	364, 429	6, 591, 629	5, 334, 488	4, 374, 280
1924	340	18	358	1, 514, 182	8, 174, 610	418, 506	8, 593, 116	3, 254, 370	2, 180, 428
1925	412	30	442	1, 745, 674	7, 076, 704	150, 318	7, 227, 022	4, 506, 940	3, 127, 816
1926	387	31	418	1, 839, 740	7, 031, 079	46, 954	7, 078, 033	4, 704, 122	2, 935, 372

Year	Copper		Lead		Zinc		Total value
	Pounds	Value	Pounds	Value	Pounds	Value	
1917	8, 122, 004	$2, 217, 307	67, 990, 012	$5, 847, 141	120, 315, 775	$12, 272, 209	$42, 084, 668
1918	6, 277, 332	1, 550, 501	65, 960, 760	4, 683, 214	89, 133, 901	8, 111, 185	34, 160, 172
1919	3, 560, 207	662, 198	37, 070, 241	1, 964, 722	37, 220, 493	2, 717, 096	21, 679, 614
1920	4, 043, 734	744, 047	46, 629, 788	3, 730, 383	48, 790, 742	3, 952, 050	21, 898, 974
1921	4, 153, 442	535, 794	19, 660, 466	884, 721	2, 360, 000	118, 000	14, 005, 500
1922	3, 373, 454	455, 416	23, 477, 200	1, 291, 246	23, 258, 000	1, 325, 706	15, 301, 698
1923	4, 248, 109	624, 472	45, 698, 185	3, 198, 873	54, 152, 000	3, 682, 336	18, 471, 590
1924	2, 713, 219	355, 432	47, 557, 061	3, 804, 565	56, 727, 000	3, 687, 255	18, 620, 796
1925	2, 360, 500	335, 191	62, 966, 000	5, 478, 042	61, 621, 000	4, 683, 196	20, 851, 267
1926	3, 403, 850	476, 539	68, 987, 800	5, 519, 024	65, 000, 000	4, 875, 000	20, 883, 968

Gold and silver produced at placer mines in Colorado, 1917–1926, in fine ounces

Year	Sluicing and hydraulic		Dredging		Total	
	Gold	Silver	Gold	Silver	Gold	Silver
1917	755. 53	129	31, 221. 71	8, 173	31, 977. 24	8, 302
1918	158. 72	8	25, 296. 30	6, 642	25, 455. 02	6, 650
1919	409. 18	87	26, 224. 26	7, 056	26, 633. 44	7, 143
1920	82. 81	22	24, 810. 39	6, 694	24, 893. 20	6, 716
1921	323. 63	96	16, 348. 32	4, 346	16, 671. 95	4, 442
1922	487. 43	128	16, 753. 57	4, 100	17, 241. 00	4, 228
1923	269. 22	66	17, 360. 03	4, 056	17, 629. 25	4, 122
1924	310. 85	81	19, 934. 38	4, 873	20, 245. 23	4, 954
1925	445. 77	101	6, 825. 86	1, 798	7, 271. 63	1, 899
1926	391. 54	67	1, 879. 86	502	2, 271. 40	569

GOLD

The mine production of gold in Colorado in 1926 was 342,399.84 fine ounces, valued at $7,078,033, a decrease of 7,207.36 fine ounces and of $148,989 from 1925.

The Cripple Creek district contributed $4,436,012, or 63 per cent, of this total yield. That part of the San Juan region including Dolores, La Plata, Ouray, San Juan, and San Miguel Counties yielded $1,710,252, a decrease of $55,530. The largest increases were $102,289 in Rio Grande County, $60,311 in Boulder, $29,891 in Ouray,

$25,693 in Lake, and $24,336 in Clear Creek. The largest decreases were $172,592 in Teller County, $63,559 in Summit, $53,598 in San Miguel, $51,129 in Gilpin, $17,602 in La Plata, $16,132 in San Juan, and $15,563 in Park.

The output of placer gold in Colorado in 1926 was $46,954, a decrease of $103,364. Summit County, with 1 dredge, 3 hydraulic, and 2 sluice mines, produced 59 per cent of the placer gold and Lake County produced 27 per cent. The other counties producing placer gold in 1926 were Adams, Chaffee, Douglas, Elbert, Gilpin, Moffat, Montrose, and Park.

SILVER

The mine production of silver in Colorado in 1926 was 4,704,122 fine ounces, valued at $2,935,372, a decrease of $192,444 from 1925. The largest increases were $136,904 in Saguache County, $44,439 in Ouray, $34,842 in Clear Creek, $30,566 in Dolores, $16,018 in Boulder, and $10,819 in Gilpin. The largest decreases were $173,241 in Lake County, $168,566 in Mineral, $63,405 in Pitkin, $18,071 in San Juan, $16,163 in Hinsdale, $14,172 in La Plata, and $13,601 in Summit.

COPPER

The mine production of copper in Colorado in 1926 was 3,403,850 pounds, valued at $476,539, an increase of $141,348 from 1925. San Juan County produced 45.8 per cent of the copper output, Saguache 26.4 per cent, San Miguel 7.5 per cent, Lake 6.5 per cent, and Ouray 6 per cent.

LEAD

The mine production of lead in Colorado in 1926, reckoned as lead in lead bullion and in leaded zinc oxide, was 68,987,800 pounds, valued at $5,519,024, an increase of $40,982 over 1925. With the exception of increases in quantity and value in Dolores, Lake, Saguache, and San Miguel Counties there were decreases in all the important lead-producing counties.

ZINC

The zinc-bearing ores marketed from Colorado in 1926 contained 65,000,000 pounds of recoverable zinc, valued at $4,875,000, an increase of $191,804 over 1925. San Juan County led in zinc production in 1926 with 22,423,000 pounds, 34.5 per cent of the zinc output of the State, compared with 36 per cent in 1925. Lake County ranked second in 1926 and produced 22,324,000 pounds, 34.3 per cent of the total, as against 12 per cent in 1925. Other of the larger zinc-producing counties, in order of output in 1926, were Eagle, Dolores, Summit, Gunnison, Pitkin, and San Miguel.

Mine production of gold, silver, copper, lead, and zinc in Colorado in 1926, by counties

County	Mines producing			Gold (lode and placer)		Silver (lode and placer)	
	Lode	Placer	Total	Fine ounces	Value	Fine ounces	Value
Adams		2	2	212.03	$4,383	35	$22
Boulder	47		47	5,557.17	114,877	71,750	44,772
Chaffee	5	4	9	153.50	3,173	5,093	3,178
Clear Creek	59		59	4,260.87	88,080	272,492	170,035
Custer	5		5	2.61	54	4,255	2,655
Dolores	8		8	188.76	3,902	92,040	57,433
Douglas		2	2	3.00	62		
Eagle	5		5	528.74	10,930	106,452	66,426
Elbert		1	1	7.16	148		
Gilpin	43	5	48	2,046.69	42,309	38,106	23,778
Gunnison	8		8	205.55	4,249	29,399	18,345
Hinsdale	9		9	58.88	1,217	4,311	2,690
Lake	55	2	57	22,720.68	469,678	714,585	445,901
La Plata	7		7	313.08	6,472	2,681	1,673
Mineral	5		5	32.51	672	551,468	344,116
Moffat		5	5	10.93	226		
Montrose		2	2	6.38	132		
Ouray	19		19	2,121.39	43,853	111,181	69,377
Park	8	2	10	1,803.09	37,273	7,835	4,889
Pitkin	13		13			242,290	151,189
Rio Grande	1		1	5,118.02	105,799	88	55
Saguache	9		9	265.63	5,491	289,505	180,651
San Juan	15		15	14,308.74	295,788	869,963	542,857
San Miguel	14		14	65,801.46	1,360,237	1,206,277	752,717
Summit	16	6	22	2,080.89	43,016	58,707	36,633
Teller	36		36	214,592.08	4,436,012	25,609	15,980
	387	31	418	342,399.84	7,078,033	4,704,122	2,935,372
Total, 1925	412	30	442	349,607.20	7,227,022	4,506,940	3,127,816

County	Copper		Lead		Zinc		Total value
	Pounds	Value	Pounds	Value	Pounds	Value	
Adams							$4,405
Boulder	2,800	$392	206,450	$16,516			176,557
Chaffee	2,600	364	164,600	13,168	237,200	$17,790	37,673
Clear Creek	11,715	1,640	664,000	53,120	105,000	7,875	320,750
Custer			936,600	74,928			77,637
Dolores	107,400	15,036	5,834,500	466,760	5,962,000	447,150	990,281
Douglas							62
Eagle	105,000	14,700	2,609,000	208,720	7,635,000	572,625	873,401
Elbert							148
Gilpin	11,150	1,561	242,800	19,424	33,000	2,475	89,547
Gunnison	9,550	1,337	871,000	69,680	868,000	65,100	158,711
Hinsdale	3,350	469	144,300	11,544	26,600	1,995	17,915
Lake	222,400	31,136	18,545,000	1,483,600	22,324,000	1,674,300	4,104,615
La Plata							8,145
Mineral			354,700	28,376			373,164
Moffat							226
Montrose							132
Ouray	204,700	28,658	612,200	48,976	134,000	10,050	200,914
Park	1,750	245	48,500	3,880			46,287
Pitkin			3,263,800	261,104	450,000	33,750	446,043
Rio Grande							105,854
Saguache	897,285	125,620	3,085,200	246,816	265,800	19,935	578,513
San Juan	1,560,400	218,456	18,460,600	1,476,848	22,423,000	1,681,725	4,215,674
San Miguel	255,900	35,826	9,981,900	798,552	318,000	23,850	2,971,182
Summit	7,850	1,099	2,962,650	237,012	4,218,400	316,380	634,140
Teller							4,451,992
	3,403,850	476,539	68,987,800	5,519,024	65,000,000	4,875,000	20,883,968
Total, 1925	2,360,500	335,191	62,966,000	5,478,042	61,621,000	4,683,196	20,851,267

Gold and silver produced at lode and placer mines in Colorado in 1926, by counties

County	Lode mines					Placer mines				Grand total value
	Ore sold or treated	Gold	Silver		Total value	Gold	Silver		Total value	
	Short tons		*Fine ounces*				*Fine ounces*			
Adams						$4,383	35	$22	$4,405	$4,405
Boulder	32,127	$114,877	71,750	$44,772	$159,649					159,649
Chaffee	1,482	2,637	5,088	3,175	5,812	536	5	3	539	6,351
Clear Creek	64,865	88,080	272,492	170,035	258,115					258,115
Custer	37,081	54	4,255	2,655	2,709					2,709
Dolores	29,764	3,902	92,040	57,433	61,335					61,335
Douglas						62			62	62
Eagle	48,061	10,930	106,452	66,426	77,356					77,356
Elbert						148			148	148
Gilpin	7,207	41,356	38,098	23,773	65,129	953	8	5	958	66,087
Gunnison	3,034	4,249	29,399	18,345	22,594					22,594
Hinsdale	320	1,217	4,311	2,690	3,907					3,907
Lake	215,315	457,054	714,399	445,785	902,839	12,624	186	116	12,740	915,579
La Plata	119	6,472	2,681	1,673	8,145					8,145
Mineral	8,855	672	551,468	344,116	344,788					344,788
Moffat						226			226	226
Montrose						132			132	132
Ouray	3,526	43,853	111,181	69,377	113,230					113,230
Park	3,489	37,146	7,835	4,889	42,035	127			127	42,162
Pitkin	27,534		242,290	151,189	151,189					151,189
Rio Grande	21	105,799	88	55	105,854					105,854
Saguache	50,926	5,491	289,505	180,651	186,142					186,142
San Juan	289,401	295,788	869,963	542,857	838,645					838,645
San Miguel	478,116	1,360,237	1,206,277	752,717	2,112,954					2,112,954
Summit	38,684	15,253	58,372	36,424	51,677	27,763	335	209	27,972	79,649
Teller	499,813	4,436,012	25,609	15,980	4,451,992					4,451,992
	1,839,740	7,031,079	4,703,553	2,935,017	9,966,096	46,954	569	355	47,309	10,013,405
Total, 1925	1,745,674	7,076,704	4,505,041	3,126,498	10,203,202	150,318	1,899	1,318	151,636	10,354,838

Gold and silver produced at placer mines in Colorado in 1926, by counties, in fine ounces

County	Sluicing and hydraulic		Dredging		Total	
	Gold	Silver	Gold	Silver	Gold	Silver
Adams	212.03	35			212.03	35
Chaffee	25.93	5			25.93	5
Douglas	3.00				3.00	
Elbert	7.16				7.16	
Gilpin	46.10	8			46.10	8
Lake	1.99		608.70	186	610.69	186
Moffat	10.93				10.93	
Montrose	6.38				6.38	
Park	6.15				6.15	
Summit	71.87	19	1,271.16	316	1,343.03	335
	391.54	67	1,879.86	502	2,271.40	569
Total, 1925	445.77	101	6,825.86	1,798	7,271.63	1,899

MINING INDUSTRY

The outstanding features of 1926 in the metal-mining industry of Colorado were: An increase over 1925 of less than 1 per cent in gross calculated total value of gold, silver, copper, lead, and zinc produced, as compared with an increase of 12 per cent for 1925 over 1924 (the quantities of zinc, lead, copper, and silver produced increased, but the lower average prices, especially for silver, failed to allow these quantity increases to be reflected proportionately in the value column, and there was a decrease in total value of silver; placer gold production, always relatively small, showed a relatively heavy decrease, whereas lode gold production fell off slightly); in the Cripple Creek district a falling off of $172,592 in gold production—due to the idleness of the Cresson mine for two months while the shaft was being retimbered, as the Portland gold mine and the United Gold Mines Co. group both showed increased production; in the Summitville district the shipment of $100,000 of "specimen" gold; in the Leadville district, a tripling of the 1925 zinc production and a material increase in the lead output as a result of production from the newly unwatered Carbonate Hill-Graham Park area, coupled with the operation of a new selective flotation mill; at Telluride, the continued operation of the Smuggler Union and Tomboy mines, with the closing of the latter at the end of the year; at Eureka, the continuous operation of the Sunnyside zinc-lead-copper-silver-gold mine; at Bonanza, the remodeling of the Rawley mill and renewal of operation at a rate of 350 tons a day; in Ouray County, the reopening (under lease) of the upper levels of the Camp Bird mine, nonproductive since June 30, 1916, and the sale to Salt Lake Valley (Utah) plants of zinc-lead-copper-silver-gold ores from the Red Mountain district; in Hinsdale County, the sale of zinc-lead-silver-gold ores to Salt Lake Valley plants; at Rico, heavy shipments of zinc-lead-iron-silver ore to Salt Lake Valley custom flotation plants, and the building and operation (after November 1) of a 225-ton custom flotation plant at Rico; at Garfield, the reopening of zinc-lead-silver ores left in old properties; at Aspen and Creede, reduced silver outputs; at Climax, the gradual increase in tonnage of molybdenum ore treated from 10,000 tons a month in January to 22,000 tons in December; at Kokomo, the failure to find commercial zinc-lead ore bodies in reopened old mines; at Breckenridge, the continuous operation of the Wellington mine, but the continued idleness of the Tonopah dredge and the enforced idleness until September of the Blue River dredge under reconstruction; at Montezuma, an increased production of zinc-lead-silver ores; at Whitepine, production from the Akron and Morning Star mines for only part of the year; at Ilse, the continued production of the high-grade lead (cerussite) concentrates from the Terrible mine; at Gilman, the shipment of zinc-lead-silver-gold ores and silver-copper-iron pyrite in large quantities and continuous development of ore reserves; in Boulder County, the operation of the Boulder County mill; in Clear Creek County, the operation of the East Butte Copper Co.'s flotation mill on ores from the old Dives-Pelican-Diamond group and the discovery and shipment of 4,141 tons of gold telluride ore containing $59,230 in gold from the West Gold group, at Idaho Springs, on Chicago Creek, just above the Jackson diggings of 1859; in Gilpin County, the cleaning and placing in working order of the Newhouse (Argo) adit to make possible the development from the adit of mines on Quartz Hill and the operation of the Rose City (old Iron City) selective flotation mill; at Rifle, the steady operation of the 25-ton vanadium plant and addition thereto of two new units, bringing the capacity up to 120 tons a day by December 1.

ORE CLASSIFICATION

Ore sold or treated in Colorado, 1921–1926, with content in terms of recovered metals

Year	Ore	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
DRY GOLD ORE						
1921	495, 853	221, 292. 06	81, 157	54, 359	119, 140	------------
1922	449, 658	217, 606. 90	73, 191	57, 478	176, 202	------------
1923	410, 468	209, 867. 04	56, 837	30, 152	113, 264	------------
1924	513, 083	288, 738. 98	86, 844	55, 190	138, 884	------------
1925	515, 849	248, 900. 39	59, 345	39, 830	187, 060	16, 000
1926	519, 892	249, 199. 78	63, 597	25, 486	276, 798	------------
DRY GOLD AND SILVER ORE						
1921	269, 087	53, 991. 30	589, 284	891, 660	3, 409, 026	------------
1922	397, 191	58, 192. 31	1, 756, 858	1, 053, 975	7, 223, 125	------------
1923	480, 340	67, 260. 95	1, 567, 091	1, 375, 938	10, 202, 564	------------
1924	435, 876	78, 811. 00	936, 118	525, 702	7, 206, 007	278, 000
1925	446, 361	71, 240. 41	929, 072	158, 200	7, 302, 300	------------
1926	482, 361	70, 227. 48	1, 005, 660	177, 783	7, 553, 239	------------
DRY SILVER ORE						
1921	465, 232	31, 733. 60	3, 991, 193	1, 882, 519	10, 561, 401	------------
1922	449, 652	10, 421. 10	3, 418, 709	1, 917, 436	7, 162, 729	------------
1923	275, 662	6, 247. 87	2, 330, 396	1, 386, 215	8, 382, 956	------------
1924	125, 917	1, 966. 08	956, 420	401, 365	5, 630, 165	------------
1925	224, 844	1, 398. 10	1, 840, 621	121, 780	9, 640, 965	------------
1926	237, 942	1, 550. 08	1, 729, 130	1, 116, 700	10, 426, 210	------------
COPPER ORE						
1921	22, 195	1, 811. 24	382, 521	1, 164, 248	10, 522	------------
1922	863	556. 47	31, 463	105, 864	18, 575	------------
1923	4, 655	2, 139. 88	110, 552	302, 685	71, 194	------------
1924	1, 803	2, 136. 19	24, 666	119, 315	24, 219	------------
1925	2, 193	1, 936. 51	53, 902	286, 410	59, 100	------------
1926	2, 126	688. 99	43, 312	315, 152	32, 359	------------
COPPER-LEAD ORE						
1921	820	24. 60	40, 949	78, 448	184, 221	------------
1922	627	84. 47	37, 418	60, 299	162, 646	------------
1923	380	122. 57	16, 680	23, 502	76, 492	------------
1924	425	303. 50	21, 540	41, 498	104, 456	------------
1925	1, 417	98. 85	30, 373	77, 500	265, 800	------------
1926	97	23. 32	2, 628	8, 125	24, 219	------------
LEAD ORE						
1921	18, 289	5, 089. 73	524, 023	81, 260	4, 851, 872	------------
1922	48, 381	3, 906. 13	493, 697	141, 082	7, 062, 288	------------
1923	90, 410	3, 339. 22	625, 974	143, 791	10, 675, 407	------------
1924	67, 979	3, 586. 75	379, 635	38, 441	9, 023, 359	------------
1925	95, 113	2, 616. 01	527, 478	49, 480	11, 283, 375	------------
1926	93, 531	1, 997. 82	626, 986	30, 333	11, 734, 527	------------
LEAD-ZINC ORE						
1921	4, 178	30. 60	14, 851	948	456, 720	483, 000
1922	22, 113	304. 57	40, 056	37, 320	1, 660, 135	7, 527, 000
1923	214, 185	11, 966. 62	571, 619	966, 843	15, 519, 061	21, 021, 400
1924	350, 153	19, 877. 46	842, 341	1, 531, 708	25, 419, 677	50, 608, 000
1925	448, 096	16, 144. 16	1, 064, 199	1, 627, 300	34, 226, 400	57, 777, 000
1926	495, 507	16, 438. 30	1, 232, 010	1, 730, 271	38, 940, 448	62, 551, 000

Ore sold or treated in Colorado, 1921–1926, with content in terms of recovered metals—Continued

ZINC ORE

Year	Ore	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
1921	5, 727	13. 91	3, 237		67, 564	1, 877, 000
1922	43, 615	1. 20	291		11, 500	15, 731, 000
1923	93, 000	296. 65	51, 217	18, 983	657, 247	33, 130, 600
1924	18, 946	26. 79	1, 852		10, 294	5, 841, 000
1925	11, 801	1. 14	51		1, 000	3, 828, 000
1926	8, 284	2. 67	230			2, 449, 000

Ore sold or treated in Colorado in 1926, with content in terms of recovered metals

Source	Ore		Gold		Silver	
	Short tons	Per cent	Fine ounces	Per cent	Fine ounces	Per cent
Dry gold ore	519, 892	28. 26	249, 199. 78	72. 78	63, 597	1. 35
Dry gold and silver ore	482, 361	26. 22	70, 227. 48	20. 51	1, 005, 660	21. 38
Dry silver ore	237, 942	12. 93	1, 550. 08	. 45	1, 729, 130	36. 76
	1, 240, 195	67. 41	320, 977. 34	93. 74	2, 798, 387	59. 49
Copper ore	2, 126	. 12	688. 99	. 20	43, 312	. 92
Copper-lead ore	97	. 01	23. 32	. 01	2, 628	. 06
Lead ore	93, 531	5. 08	1, 997. 82	. 59	626, 986	13. 33
Lead-zinc ore	495, 507	26. 93	16, 438. 30	4. 80	1, 232, 010	26. 19
Zinc ore	8, 284	. 45	2. 67		230	
	599, 545	32. 59	19, 151. 10	5. 60	1, 905, 166	40. 50
Total, lode mines	1, 839, 740	100. 00	340, 128. 44	99. 34	4, 703, 553	99. 99
Total, placers			2, 271. 40	. 66	569	. 01
	1, 839, 740	100. 00	342, 399. 84	100. 00	4, 704, 122	100. 00
Total, 1925	1, 745, 674		349, 607. 20		4, 506, 940	

Source	Copper		Lead		Zinc	
	Pounds	Per cent	Pounds	Per cent	Pounds	Per cent
Dry gold ore	25, 486	0. 75	276, 798	0. 40		
Dry gold and silver ore	177, 783	5. 22	7, 553, 239	10. 95		
Dry silver ore	1, 116, 700	32. 81	10, 426, 210	15. 11		
	1, 319, 969	38. 78	18, 256, 247	26. 46		
Copper ore	315, 152	9. 26	32, 359	. 05		
Copper-lead ore	8, 125	. 24	24, 219	. 04		
Lead ore	30, 333	. 89	11, 734, 527	17. 01		
Lead-zinc ore	1, 730, 271	50. 83	38, 940, 448	56. 44	62, 551, 000	96. 23
Zinc ore					2, 449, 000	3. 77
	2, 083, 881	61. 22	50, 731, 553	73. 54	65, 000, 000	100. 00
	3, 403, 850	100. 00	68, 987, 800	100. 00	65, 000, 000	100. 00
Total, 1925	2, 360, 500		62, 966, 000		61, 621, 000	

Ore sold or treated in Colorado in 1926, by counties, with content in terms of recovered metals

DRY GOLD ORE

County	Ore	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Boulder	1,055	1,411.47	1,039			
Clear Creek	6,281	3,814.05	4,564	2,079	15,850	
Eagle	2	4.20	28			
Gilpin	3,972	1,794.66	4,381	9,200	47,200	
Gunnison	56	92.25	173		500	
Lake	4,806	18,699.12	23,142	13,057	170,848	
La Plata	90	263.38	908			
Ouray	356	1,319.55	1,231			
Park	3,420	1,769.07	1,197	1,150	42,400	
Rio Grande	21	5,118.02	88			
San Miguel	20	312.20	1,236			
Summit		9.73	1			
Teller	499,813	214,592.08	25,609			
	519,892	249,199.78	63,597	25,486	276,798	

DRY GOLD AND SILVER ORE

Boulder	30,971	4,117.21	62,247	2,000	177,300	
Clear Creek	1,122	197.67	5,722	5,035	17,500	
Eagle	11	10.40	365			
Gilpin	270	16.72	727		19,500	
Gunnison	33	44.50	820		2,400	
Hinsdale	44	35.40	1,069		3,700	
Lake	2,288	1,036.90	31,392	76,248	39,239	
La Plata	22	40.50	706			
Park	2	17.66	444			
San Miguel	445,046	64,574.72	896,204	93,900	7,182,500	
Summit	2,552	135.80	5,964	600	111,100	
	482,361	70,227.48	1,005,660	177,783	7,553,239	

DRY SILVER ORE

Boulder	7	.72	596			
Chaffee	163	17.50	1,423	250	13,300	
Clear Creek	53,896	6.68	218,347	150	263,140	
Custer	11		257		300	
Eagle	7,327	450.60	84,042	105,000		
Gilpin	1,795	37.60	13,525		42,300	
Gunnison	2	.29	138			
Lake	81,401	.10	214,087		4,170,320	
La Plata	7	9.20	1,067			
Mineral	8,855	32.51	551,468		354,700	
Ouray	39	1.60	1,062	700		
Park	58	4.60	5,684	600	4,850	
Pitkin	8,625		67,171		443,700	
Saguache	44,018	236.28	268,153	893,000	2,721,300	
San Juan			25			
San Miguel	31,702	751.60	299,962	117,000	2,410,500	
Summit	36	.80	2,123		1,800	
	237,942	1,550.08	1,729,130	1,116,700	10,426,210	

COPPER ORE

Clear Creek	21	113.82	496	2,170	200	
Gilpin	20	30.04	326	1,600		
Lake	1,224	423.90	30,457	118,890	9,599	
Ouray	793	111.73	8,612	185,100	20,200	
Saguache	38	9.50	2,672	3,592	1,660	
Summit	30		749	3,800	700	
	2,126	688.99	43,312	315,152	32,359	

Ore sold or treated in Colorado in 1926, by counties, with content in terms of recovered metals—Continued

COPPER-LEAD ORE

County	Ore	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Ouray	25	1. 52	212	2, 700	3, 900	----------
San Juan	72	21. 80	2, 416	5, 425	20, 319	----------
	97	23. 32	2, 628	8, 125	24, 219	----------
LEAD ORE						
Boulder	94	27. 77	7, 868	800	29, 150	----------
Chaffee	66	. 75	569	----------	41, 700	----------
Clear Creek	499	100. 38	31, 749	1, 700	236, 910	----------
Custer	37, 070	2. 61	3, 998	----------	936, 300	----------
Dolores	1, 299	49. 80	14, 233	5, 300	599, 800	----------
Eagle	4	----------	32	----------	1, 000	----------
Gilpin	300	75. 39	17, 512	350	87, 850	----------
Gunnison	334	9. 05	8, 178	2, 360	139, 460	----------
Hinsdale	162	11. 19	2, 599	2, 100	112, 050	----------
Lake	33, 714	1, 074. 87	259, 348	7, 005	6, 247, 426	----------
Ouray	1, 650	579. 00	96, 004	6, 100	413, 000	----------
Park	9	5. 61	510	----------	1, 250	----------
Pitkin	17, 725	----------	168, 907	----------	2, 568, 400	----------
Saguache	109	1. 60	1, 775	543	34, 800	----------
San Juan	300	46. 14	8, 981	3, 575	157, 281	----------
San Miguel	25	1. 33	370	----------	8, 900	----------
Summit	171	12. 33	4, 353	500	119, 250	----------
	93, 531	1, 997. 82	626, 986	30, 333	11, 734, 527	----------
LEAD-ZINC ORE						
Chaffee	1, 210	109. 32	3, 096	2, 350	109, 600	221, 200
Clear Creek	3, 046	28. 27	11, 614	581	130, 400	105, 000
Dolores	28, 465	138. 96	77, 807	102, 100	5, 234, 700	5, 962, 000
Eagle	(1)	(1)	(1)	(1)	(1)	(1)
Gilpin	806	44. 96	1, 607	----------	45, 950	27, 000
Gunnison	2, 609	59. 46	20, 090	7, 190	728, 640	868, 000
Hinsdale	114	12. 29	643	1, 250	28, 550	26, 600
Lake	83, 733	875. 10	155, 973	7, 200	7, 907, 568	19, 911, 000
Ouray	663	107. 99	4, 060	10, 100	175, 100	134, 000
Pitkin	1, 184	----------	6, 212	----------	251, 700	450, 000
Saguache	6, 761	18. 25	16, 905	150	327, 440	265, 800
San Juan	289, 029	14, 240. 80	858, 541	1, 551, 400	18, 283, 000	22, 423, 000
San Miguel	1, 323	161. 61	8, 505	45, 000	380, 000	318, 000
Summit and Eagle	76, 564	641. 29	66, 957	2, 950	5, 337, 800	11, 839, 400
	495, 507	16, 438. 30	1, 232, 010	1, 730, 271	38, 940, 448	62, 551, 000
ZINC ORE						
Chaffee	43	----------	----------	----------	----------	16, 000
Gilpin	44	1. 22	20	----------	----------	6, 000
Lake	8, 149	----------	----------	----------	----------	2, 413, 000
Summit	48	1. 45	210	----------	----------	14, 000
	8, 284	2. 67	230	----------	----------	2, 449, 000

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[1] Included with Summit County.

METAL CONTENT OF ZINC-BEARING MATERIALS

The following table gives the kind and grade of zinc-bearing materials marketed in 1926.

Zinc-lead and zinc ores and zinc-lead and zinc concentrates as sold at the mine in Colorado in 1926 to custom milling plants, zinc retort furnaces, and leaded zinc oxide plants, in terms of original content

Classification	County	Dry weight	Gold		Silver	
			Content	Average assay	Content	Average assay
		Short tons	*Fine ounces*	*Fine ounces*	*Fine ounces*	*Fine ounces*
Oxidized: Zinc carbonate smelting ore.	Chaffee and Lake	8,192				
Sulphide:						
Zinc and zinc-lead concentrates.	Clear Creek and Gilpin	238	16.76	0.070	5,964	25.06
Zinc-lead milling ore	Dolores, Ouray, San Juan, and San Miguel.	30,630	553.61	.018	115,132	3.76
Zinc-lead smelting and milling ore.	Chaffee, Eagle, Lake, Pitkin, and Summit.	87,487	1,164.43	.013	150,195	1.72
Zinc-lead milling ore	Gunnison and Hinsdale	2,723	103.76	.038	24,163	8.87
Zinc-lead and zinc concentrates and middlings.	Lake, Saguache, San Juan, and Summit.	47,749	5,771.41	.121	365,794	7.66
Total sulphide		168,827	7,609.97	.045	661,248	3.92
Total oxidized and sulphide.		177,019	7,609.97		661,248	

Classification	Copper		Lead		Zinc		
	Content	Average assay	Content	Wet assay	Content	Average assay	Estimated recoverable zinc
	Pounds	*Per cent*	*Pounds*	*Per cent*	*Pounds*	*Per cent*	*Pounds*
Oxidized: Zinc carbonate smelting ore					3,069,756	18.74	2,429,000
Sulphide:							
Zinc and zinc-lead concentrates			32,522	6.83	177,647	37.32	138,000
Zinc-lead milling ore	306,077	0.50	7,488,988	12.22	9,829,451	16.05	6,443,000
Zinc-lead smelting and milling ore			13,172,235	7.53	32,096,032	18.34	22,347,600
Zinc-lead milling ore			898,848	16.50	1,273,973	23.39	894,600
Zinc-lead and zinc concentrates and middlings	1,020,310	1.07	5,930,891	6.21	43,645,957	45.70	32,747,800
Total sulphide	1,326,387		27,523,484	8.15	87,023,060	25.77	62,571,000
Total oxidized and sulphide	1,326,387		27,523,484		90,092,816		65,000,000

METALLURGIC INDUSTRY

Custom reduction plants in the State continued to operate as in 1925 and comprised the following: Lead bullion-leady copper matte smelters at Leadville and Durango; the magnetic separation mill and zinc oxide plant at Canon City; the zinc oxide plant at Leadville; the fuming, matting, and zinc oxide plant at Florence; the roast-amalgamation-cyanidation mill at Colorado Springs; the sampling works at Victor, Idaho Springs, and Boulder; the arsenic-cadmium plant at the old Globe smelter, near Denver; and, after November 1, the International selective flotation mill at Rico.

Mine production of metals in Colorado in 1926, by methods of recovery

Method of recovery	Material treated	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Ore amalgamated	757,783	95,055.09	19,671	----------	----------	----------
Ore, sands, and slimes cyanided	508,060	151,571.84	21,662	----------	----------	----------
Concentrates smelted	156,943	70,139.52	2,936,278	2,849,371	48,293,500	49,922,300
Ore smelted	214,434	23,361.99	1,725,942	554,479	20,694,300	15,077,700
Placer	--------	2,271.40	569	----------	----------	----------
	--------	342,399.84	4,704,122	3,403,850	68,987,800	65,000,000

Ores, slimes, and sands treated by amalgamation and cyanidation and gold and silver contained in bullion and precipitates in Colorado in 1926

Process	Material treated	Gold in bullion	Silver in bullion	Quicksilver used	Sodium cyanide used
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*
Amalgamation	757,783	95,055.09	19,671	3,690	----------
Cyanidation	[1] 508,060	151,571.84	21,662	----------	[2] 258,327
	----------	246,626.93	41,333	3,690	[2] 258,327

[1] Includes 203,091 tons of crude ore and concentrates treated directly by cyanidation and duplicates 304,969 tons (in the form of sands and slimes) from ore and concentrates treated first by amalgamation.

[2] In terms of 96 to 98 per cent strength.

Mine production of metals from gold and silver mills in Colorado in 1926, by counties

County	Ore treated	Recovered in bullion		Concentrates and recovered metal					
		Gold	Silver	Concentrates produced	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Short tons*	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Boulder	1,028	1,276.52	259	29	47.76	466	--------	--------	--------
Clear Creek	4,596	2,940.66	35	18	33.44	244	200	1,900	--------
Gilpin	3,585	838.63	282	578	689.05	3,122	6,450	46,400	--------
Gunnison	--------	24.95	17	--------	--------	--------	--------	--------	--------
Lake	1,422	7,734.42	875	--------	--------	--------	--------	--------	--------
Ouray	356	1,319.55	1,231	--------	--------	--------	--------	--------	--------
Park	3,137	306.67	105	142	498.20	579	1,150	29,050	--------
San Miguel	444,987	17,583.72	12,919	35,679	46,961.30	882,206	93,300	7,178,500	--------
Summit	--------	9.73	1	--------	--------	--------	--------	--------	--------
Teller	499,813	214,592.08	25,609	(1)	(1)	(1)	--------	--------	--------
	958,924	246,626.93	41,333	36,446	48,229.75	886,617	101,100	7,255,850	--------
Total, 1925	898,488	252,601.70	46,451	33,029	43,759.07	826,577	122,100	7,017,700	16,000

[1] Concentrates produced were cyanided and contents are included in bullion recovered.

NOTE.—Average recovery per ton in bullion and concentrates: Gold, 0.307 ounce; silver, 0.9677 ounce.

Mine production of metals from concentrating mills in Colorado in 1926, by counties

County	Ore treated	Concentrates and recovered metal					
		Concentrates produced	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Short tons*	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Boulder	30, 954	850	4, 072. 33	62, 011	1, 700	176, 000	----------
Chaffee	346	107	17. 25	868	2, 350	20, 700	68, 300
Clear Creek	59, 532	2, 154	643. 91	235, 074	5, 731	419, 520	105, 000
Custer	36, 984	748	----------	----------	----------	911, 000	----------
Dolores	28, 465	12, 019	138. 96	77, 807	102, 100	5, 234, 700	5, 962, 000
Eagle	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Gilpin	3, 066	285	132. 72	13. 579	550	104, 900	33, 000
Gunnison	2, 609	1, 758	59. 46	20, 090	7, 190	728, 640	868, 000
Hinsdale	114	55	12. 29	643	1, 250	28, 550	26, 600
Lake	44, 794	15, 659	543. 15	91, 222	7, 200	3, 314, 000	7, 756, 000
Ouray	813	369	112. 47	4, 543	10, 100	193, 100	134, 000
Pitkin	6, 878	1, 511	----------	20, 347	----------	340, 700	125, 000
Saguache	50, 709	6, 165	254. 53	283, 977	893, 150	3, 044, 940	264, 000
San Juan	289, 029	52, 023	14, 240. 80	858, 541	1, 551, 400	18, 283, 000	22, 423, 000
San Miguel	33, 025	4, 194	913. 21	308, 467	162, 000	2, 790, 500	318, 000
Summit and Eagle	79, 064	22, 600	768. 69	72, 492	3, 550	5, 447, 400	11, 839. 400
	666, 382	120, 497	21, 909. 77	2, 049, 661	2, 748, 271	41, 037, 650	49, 922, 300
Total, 1925	623, 620	131, 270	26, 752. 97	1, 413, 301	1, 742, 980	36, 310, 175	52, 785, 000

[1] Included with Summit County.

Mine production of metals from Colorado concentrates in 1926, by counties

	Concentrates	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Boulder	879	4, 120. 09	62, 477	1, 700	176, 000	----------
Chaffee	107	17. 25	868	2, 350	20, 700	68, 300
Clear Creek	2, 172	677. 35	235, 318	5, 931	421, 420	105, 000
Custer	748	----------	----------	----------	911, 000	----------
Dolores	12, 019	138. 96	77, 807	102, 100	5, 234, 700	5, 962, 000
Eagle	(1)	(1)	(1)	(1)	(1)	(1)
Gilpin	863	821. 77	16, 701	7, 000	151, 300	33, 000
Gunnison	1, 758	59. 46	20, 090	7, 190	728, 640	868, 000
Hinsdale	55	12. 29	643	1, 250	28, 550	26, 600
Lake	15, 659	543. 15	91, 222	7, 200	3, 314, 000	7, 756, 000
Ouray	369	112. 47	4, 543	10, 100	193, 100	134, 000
Park	142	498. 20	579	1, 150	29, 050	----------
Pitkin	1, 511	----------	20, 347	----------	340, 700	125, 000
Saguache	6, 165	254. 53	283, 977	893, 150	3, 044, 940	264, 000
San Juan	52, 023	14, 240. 80	858, 541	1, 551, 400	18, 283, 000	22, 423, 000
San Miguel	39, 873	47, 874. 51	1, 190, 673	255, 300	9, 969, 000	318, 000
Summit and Eagle	22, 600	768. 69	72, 492	3, 550	5, 447, 400	11, 839, 400
	156, 943	70, 139. 52	2, 936, 278	2, 849, 371	48, 293, 500	49, 922, 300
Total, 1925	164, 299	70, 512. 04	2, 239, 878	1, 865, 080	43, 327, 875	52, 801, 000

BY KINDS OF CONCENTRATES

Dry gold	595	844. 14	3, 771	4, 600	3, 750	----------
Dry gold and silver	112	92. 79	1, 969	1, 950	3, 100	----------
Copper	27	17. 82	238	1, 500	----------	----------
Copper-lead	5, 369	236. 28	267, 142	893, 000	2, 721, 000	----------
Lead	80, 267	63, 099. 97	2, 284, 620	1, 237, 876	40, 322, 433	----------
Total to copper and lead plants	86, 370	64, 291. 00	2, 557, 740	2, 138, 926	43, 050, 283	----------
Lead-zinc	34, 983	5, 713. 39	356, 134	710, 445	4, 850, 400	22, 834, 500
Zinc	35, 590	135. 13	22, 404	----------	392, 817	27, 087, 800
Total to zinc and lead-zinc plants	70, 573	[2] 5, 848. 52	[2] 378, 538	[2] 710, 445	[3] 5, 243, 217	[4] 49, 922, 300
	156, 943	70, 139. 52	2, 936, 278	2, 849, 371	48, 293, 500	49, 922, 300

[1] Included with Summit County.

[2] Recovered in zinc residues.

[3] Lead recovered in zinc residues and leaded zinc oxide.

[4] Zinc recovered as metal and zinc in zinc oxide.

Mine production of metals from Colorado concentrates in 1926, by counties—Con.

AVERAGE RECOVERABLE CONTENT

	Gold	Silver	Copper	Lead	Zinc
	Fine ounces per ton	*Fine ounces per ton*	*Per cent*	*Per cent*	*Per cent*
Dry gold	1.42	6.34	0.39	0.32	
Dry gold and silver	.83	17.58	.87	1.38	
Copper	.66	8.81	2.78		
Copper-lead	.04	49.76	8.32	25.34	
Lead	.79	28.46	.77	25.12	
Average	.74	29.61	1.24	24.92	
Lead-zinc	.16	10.18	1.02	6.93	[5] 44.69
Zinc		.63		.55	[5] 47.08
Average	.08	5.36	.50	3.71	[5] 45.89

[5] Assay of original content, with no deductions for losses.

Mine production of metals from Colorado crude ore shipped to smelters in 1926

BY COUNTIES

	Ore	Gold	Silver	Copper	Lead	Zinc
	Short tons	*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Boulder	145	160.56	9,014	1,100	30,450	
Chaffee	1,136	110.32	4,220	250	143,900	168,900
Clear Creek	737	642.86	37,139	5,784	242,580	
Custer	97	2.61	4,255		25,600	
Dolores	1,299	49.80	14,233	5,300	599,800	
Eagle	(1)	(1)	(1)	(1)	(1)	(1)
Gilpin	556	340.19	21,115	4,150	91,500	
Gunnison	425	121.14	9,292	2,360	142,360	
Hinsdale	206	46.59	3,668	2,100	115,750	
Lake	169,099	13,832.42	622,302	215,200	15,231,000	14,568,000
La Plata	119	313.08	2,681			
Mineral	8,855	32.51	551,468		354,700	
Ouray	2,357	689.37	105,407	194,600	419,100	
Park	352	992.07	7,151	600	19,450	
Pitkin	20,656		221,943		2,923,100	325,000
Rio Grande	21	5,118.02	88			
Saguache	217	11.10	5,528	4,135	40,260	1,800
San Juan	372	67.94	11,422	9,000	177,600	
San Miguel	104	343.23	2,685	600	12,900	
Summit and Eagle	7,681	488.18	92,331	109,300	124,250	14,000
	214,434	23,361.99	1,725,942	554,479	20,694,300	15,077,700
Total, 1925	223,566	19,221.83	2,218,712	495,420	19,638,125	8,820,000

BY KINDS OF ORE

Dry gold	4,207	18,400.61	28,341	16,636	188,698	
Dry gold and silver	2,567	1,308.14	38,209	77,683	52,539	
Dry silver	100,259	522.12	916,538	106,550	4,747,990	
Copper	2,126	688.99	43,312	315,152	32,359	
Copper-lead	97	23.32	2,628	8,125	24,219	
Lead	56,397	1,993.34	626,503	30,333	10,805,527	
Total to lead and copper plants	165,653	22,936.52	1,655,531	554,479	15,851,332	
Lead-zinc	40,541	424.02	70,201		4,842,968	12,634,700
Zinc	8,240	1.45	210			2,443,000
Total to zinc smelters and oxide plants	48,781	[2] 425.47	[2] 70,411		[3] 4,842,968	[4] 15,077,700
	214,434	23,361.99	1,725,942	554,479	20,694,300	15,077,700

[1] Included with Summit County.

[2] Recovered in zinc residues.

[3] Lead recovered in zinc residues and leaded zinc oxide.

[4] Zinc recovered as zinc in zinc oxide.

Mine production of metals from Colorado crude ore shipped to smelters in 1926—Con.

AVERAGE RECOVERABLE CONTENT

	Gold	Silver	Copper	Lead	Zinc
	Fine ounces per ton	*Fine ounces per ton*	*Per cent*	*Per cent*	*Per cent*
Dry gold	4.37	6.74	0.20	2.24	
Dry gold and silver	.51	14.88	1.51	1.02	
Dry silver	.01	9.14	.05	2.37	
Copper	.32	20.37	7.41	.76	
Copper-lead	.24	27.09	4.19	12.48	
Lead	.04	11.11	.03	9.58	
Average	.14	9.99	.17	4.78	
Lead-zinc	.01	1.73		5.97	[5] 20.90
Zinc		.03			[5] 18.75
Average	.01	1.44	.13	4.96	[5] 20.54

[5] Assay of original content, with no deductions for losses.

REVIEW BY COUNTIES AND DISTRICTS

ADAMS COUNTY

A patented gold-saving device attached to the tailrace of several gravel screening and washing plants in the bed of Clear Creek above and below Federal Boulevard recovered $4,383 in placer gold and 35 ounces of silver.

BOULDER COUNTY

Central district.—The principal constituent of the ores of the Central district is gold. The most important shipper in 1926 was James Warren, jr., who, as lessee on the Wano group, shipped 7 cars of ore assaying from 1.55 to 7.30 ounces gold to the ton. Small lots of "specimen" gold and outputs ranging from parts of a ton up to 4 tons of gold ore from eight other properties contributed to make a total output for the district of $12,170 in gold, 178 ounces of silver, 300 pounds of copper, and 1,300 pounds of lead. Some of the small gold lots were taken out in the mining of fluorspar.

Gold Hill district.—The Gold Hill district produced 115 tons of ore, yielding $8,372 in gold, 963 ounces of silver, and 850 pounds of lead. All of the ore produced by the 15 producing properties, with the exception of one lot of lead-silver-gold ore from the Goldsmith Maid, was gold ore or gold and silver ore. This ore was either sold to the Denver Mint after a simple hand hammering or hand amalgamation, amalgamated at the Wood Mountain mill (at Wallstreet), or sold to the Boulder ore sampling works, from which, after mixing, it was consigned either to the Leadville lead-bullion smelter or to the Golden Cycle amalgamation-cyanidation mill. The principal producers were the Emancipation-Gardner, Happy Thought, Ingram, Monongahela, Poorman, and St. Joe mines.

Grand Island district (*Cardinal, Caribou, Eldora, and Nederland*).—The Grand Island district produced 30,981 tons of ore, yielding $84,290 in gold, 63,774 ounces of silver, 1,700 pounds of copper, and 178,900 pounds of lead. The Fairview Mining Co. operated the Boulder County group near Nederland and ran its 115-ton flotation and gravity concentration mill all year, with only short shutdowns for repairs. Lessees on the Blue Bird and Caribou mines shipped to the Leadville smelter through the Boulder sampling works small lots of ore carrying 60 to 100 ounces of silver to the ton, with occasionally some lead.

Magnolia district.—Several small lots of ore, aggregating 45 tons, carrying 100 ounces of gold and 16 ounces of silver, were mined from six properties in the Magnolia district and sold to the Boulder sampler.

Sugar Loaf district.—Twelve mines in the Sugar Loaf district made an output of 798 tons of ore, which yielded $7,927 in gold, 6,691 ounces of silver, 800 pounds of copper, and 23,600 pounds of lead. The largest producing property with respect to tons mined was the Wood Mountain mine, which produced gold ore that was milled in the 75-ton amalgamation-concentration mill on the property. During the year the mill was operated 35 shifts in all on company ore and on some custom ore from the Emancipation-Gardner mine in the Gold Hill district. A car of lead-silver ore was shipped from the J. Albion mine and another from the Yellow Pine mine, and a small lot of silver ore was shipped from the Ogallalah. The remainder of the ore was gold ore in small lots sold to the Boulder sampler, which was sold to the Golden Cycle mill when sufficient had accumulated for carload lots. Other producing mines were the Belle of Memphis, Dime, Gladys, Gray Copper, Logan, Lucky Friday, and Red Signe.

Ward district.—Two small lots of ore were shipped from the Ward district in 1926, one of which was lead-silver ore from the White Raven dump and one dry gold ore from the Wirth dump.

CHAFFEE COUNTY

Chalk Creek district (*Romley*).—The Mary Murphy mine and mill were idle in 1926.

Granite district.—Several small sluicing operations produced $536 in gold and 5 ounces of silver from bench gravels of the Arkansas River.

Monarch-Garfield district.—One car of lead-silver ore was shipped from the Eclipse mine, and 50 feet of development work was done. One lessee operating the Madonna mine in a small way shipped a car of lead-silver ore and two cars of zinc carbonate ore. A car of lead-silver ore was shipped from the Paymaster mine. The Rogers Lead Co. reopened the adits on the Great Monarch-Garfield group and shipped over 1,000 tons of lead-zinc-silver-gold sulphide ore and several cars of silver ore.

CLEAR CREEK COUNTY

Alice district (*Yankee, Lincoln*).—The Fall River Mining Co., optionee and lessee on the Lombard mines and mill, did 500 feet of development work and ran the 10-ton amalgamation-gravity concentration mill for a few days as a test on material encountered in drifting. Development work was done at the Alice, Champion, Clara, and the Gilt Edge group.

Argentine district.—The Kelso-National Mining Co. did some development work on the National group and the Josephine group in the Argentine district and shipped one car of lead-silver ore from each. Both the Gold Belt Tunnel group and the Hamill Tunnel group, new silver discoveries and relatively impressive producers in 1923 and 1924, respectively, were idle in 1926.

Empire district.—A small lot of bullion was recovered from the treatment of gold ore from the Pete Nelson property. A few tons of gold ore was shipped from the Sir John mine to the Idaho Springs sampler. The "Empire Tunnel" group was taken over in August by the Gold Dirt Mining Co., who cleaned and retimbered the adit. The mill building was leased to the Rose City Ore Co., who repaired the old equipment and installed new machinery, including flotation cells. Driving of the Denver crosscut adit was continued. Development work at the Mint and at the Summit mine amounted to 100 feet at each. The West Fork Consolidated Mines (Inc.), a consolidation of the Conqueror, General Harrison, Bay State, Sturm, Denver City, Tennessee, and Marshall-Russell groups, was engaged in development work.

Geneva Creek district.—Assessment work only was done in the Geneva Creek district.

Griffith district (Georgetown-Silver Plume).—Nine mines in the Georgetown-Silver Plume district produced 56,382 tons of ore, yielding $468 in gold, 224,577 ounces of silver, 601 pounds of copper, 367,000 pounds of lead, and 88,200 pounds of zinc, with a total gross calculated value of $176,663. Small shipments of ore were made from the Aetna, Cyclone, Dunderberg, East Griffith, D. Peters, and Virginia City mines. The East Butte Copper Co. did 262 feet of drifting, crosscutting, and raising on the Pelican level and reopened the Diamond adit for 1,004 feet. The ore, a siliceous sulphide carrying galena, sphalerite, gray copper, and pyrite, was treated in the 250-ton flotation mill of the Nashotah Mines Co. The ore was low grade, but the resulting concentrates, made at a high ratio of concentration, were relatively high grade in silver content and averaged 10 per cent wet lead assay. The S. P. Silver or Watrous 40-ton gravity concentration and flotation mill was operated part of the year on ore from the Mammoth and Stevens mines and dump ore from the Dives Pelican; lead-silver concentrates were shipped to Leadville and lead-zinc-silver concentrates to Amarillo, Tex. There was some development work at the Mendota-Frostburg group, and the gravity concentration mill (Wasatch-Colorado) was operated for a short time, producing lead and zinc concentrates.

Crosscuts amounting to 125 feet were driven and a winze of 65 feet was sunk on the property of the Capital Mining & Milling Co. Driving of the crosscut adit of the Georgetown Tunnel Transportation Co. was continued during part of the year. Work at the Mineral Chief property consisted of cleaning out the adit. At the St. George group 200 feet of drifting was done.

Idaho Springs district.—Twenty-nine mines in the Idaho Springs district produced 6,500 tons of ore, yielding $72,651 in gold, 12,503 ounces of silver, 8,564 pounds of copper, 62,000 pounds of lead, and 3,800 pounds of zinc, with a total gross calculated value of $86,897. The largest producing property was the West Gold, from which gold telluride and free gold ore were shipped to the Golden Cycle mill at Colorado Springs. Lessees on the Edgar vein in the Big Five crosscut adit mined about 1,000 tons of milling ore, from which were produced dry gold-silver concentrates and lead-silver-gold concentrates. Small lots of smelting and milling ore were mined from various properties, including the Alexander, Almaden, Argo (in Ute Creek), Bald Eagle, D. & M., Dexter, East Lake, Elliott-Barber, Freighter's Friend, Lincoln, Little Emma, Little Mattie, May Day, P. T., Queen Elizabeth, Rio Grande, Standard, Ship Ahoy, Silver Cycle, Specie Payment, Treasure Vault, and Windsor Castle. The Newton gravity concentration-flotation custom mill was operated part of the year.

Montana district (*Lawson, Dumont*).—Twelve mines in the Montana district produced 919 tons of ore, yielding $3,136 in gold, 32,689 ounces of silver, 2,550 pounds of copper, 184,000 pounds of lead, and 13,000 pounds of zinc, with a total gross calculated value of $39,586. The largest producer was the Jo Reynolds, from which was shipped to smelters several hundred tons of relatively high-grade lead ore carrying a high content of silver and about 100 tons of lead-zinc ore which was concentrated to lead-zinc concentrates. Silver ore from the Bellevue-Hudson dump was milled in the 25-ton concentration-flotation mill on the property. Other properties from which small lots of milling and smelting ore were produced were the Albro, Drummond, Free America, Legal Tender, Millington, Platts, Red Elephant, Senator, Syndicate, and Young America.

Trail Creek district (*Lamartine, Freeland*).—The Trail Creek district produced 982 tons of ore, yielding $10,953 in gold, 2,340 ounces of silver, and 23,000 pounds of lead, with a total gross calculated value of $14,253. Small lots of smelting ore were shipped from the Crazy Girl, Donaldson, Freeland, and New Era mines. In addition, the Freeland 10-stamp 40-ton concentration mill was operated for four months. The Freeland mine is opened by an 8,000-foot adit.

CONEJOS COUNTY

Platoro district.—Nothing but assessment work was done in 1926 in the Platoro district, a producer from 1882 to 1906. This district is 6½ miles south and slightly east of the Summitville district, Rio Grande County (see p. 760), which was revived in 1926 by the notable production of gold from high-grade specimen lots from the Little Annie mine, a producer of a substantial quantity of gold from 1870 to 1900 and intermittently operated from 1901 to 1923.

CUSTER COUNTY

Hardscrabble district (*Westcliffe, Silver Cliff*).—Nearly 100 tons of lead-silver ore was shipped from three properties in the Hardscrabble district, chiefly from the Passiflora mine. A new shaft sunk on this property to 250 feet in 1925 was sunk another 50 feet in 1926.

Oak Creek district.—At the Terrible mine on Oak Creek, the ore of which is a low-grade cerussite without gold and silver, much development work was done in 1926. Drifts totaled 2,052 feet, crosscuts 2,423 feet, and raises 2,627 feet, and the shaft was sunk 72 feet to a total depth of 400 feet. The wet concentration mill, consisting of 1 Universal crusher, 4 pulverizers, 2 sets of rolls, 4 Wilfley tables, and 3 Hartz-type jigs, was operated continuously at three-fourths of its full 24-hour capacity.

DOLORES COUNTY

The total gross calculated value of the mine production of metals in Dolores County in 1926 (all from Rico) was $990,281, as compared with $353,563 in 1925.

With the exception of lead-silver carbonate ore from the Union Carbonate mine and Lillie D. mine all the ore was complex lead-zinc-copper-silver-gold sulphide milling ores treated at the International flotation plants at Tooele, Utah, and Rico, Colo.; at the United States Smelting, Refining & Mining Co.'s flotation plant at Midvale, Utah; and at the Combined Metals Reduction Co.'s flotation plant at Bauer, Utah. The International 225-ton flotation plant at Rico was installed in the Pro Patria mill building, to which additions were made. The mill began operations in November, 1926.

The lead-zinc ore produced came from various properties under various options and leases. The Falcon Lead Co. was the largest producer from the Nigger Baby Hill or Yellow Jacket group. The Rico Mining & Reduction Co. shipped from the Argentine group, Iron group, Silver Swan claims, Lillie D. claim, Lucky Boy group, and Rico Wellington group. The International Smelting Co. contributed ore from the Shamrock claim. The Rico Argentine Mining Co. shipped from its Black Hawk and other properties; the company's annual report credits its property with shipments of 5,170 tons from August 26, 1925, the date of resumption after an idleness since 1920 to July 31, 1926; gross receipts were $118,393, an average of $22.90 a ton.

DOUGLAS COUNTY

Two small lots of placer gold totaling 3 ounces were sluiced from reconcentrated Dawson arkose beds in Newlin Gulch. The fineness of gold varied from 0.981¾ to 0.988½ and of silver from 0.017 to 0.010.

EAGLE COUNTY

Battle Mountain district (Red Cliff-Gilman).—Development work continued at the Eagle mine of the Empire Zinc Co. The mine is opened by an adit at Belden on the Denver & Rio Grande Western Railroad and by several shafts at Gilman. Pyrite ore, carrying chiefly silver, was shipped from this mine to Utah smelters to supplement the deficit of iron flux in that State, and zinc-iron-lead ore from this mine was shipped to the company's magnetic separation-wet concentration mill at Canon City, Colo. Zinc concentrates were shipped from Canon City to Collinsville, Okla., and to Depue, Ill.; lead concentrates to Leadville, Colo.; and iron middlings to the arsenic-cadmium plant at Globe, Colo. Other producing mines were the Ground Hog, Elliott, and Tip Top.

Holy Cross district.—Four tons of lead-silver ore shipped from the Silver Chief claim in 1926 constitutes the first production in many years from the Holy Cross district.

ELBERT COUNTY

Sluicing in the bed of Cherry Creek near Elizabeth yielded 7.16 fine ounces of gold. The fineness was 0.992½.

EL PASO COUNTY

The Golden Cycle 1,200-ton roast-amalgamation-cyanidation mill at Colorado Springs ran steadily on gold ores from the Cripple Creek, Idaho Springs, Sneffels, Leadville, and Boulder County districts.

The Cresson, Portland, and United Gold Mines Co. group in the Cripple Creek district continued to contribute the bulk of the ore to the Golden Cycle mill, but in 1926 an unusually large tonnage of low-grade dump material from the Cripple Creek district was accepted.

FREMONT COUNTY

The Empire Zinc Co.'s magnetic separation plant at Canon City was operated steadily, treating lead-zinc-iron sulphide ore from its Eagle County mine; its zinc oxide plant at Canon City was operated continuously on zinc sulphide concentrates from the company's mines at Hanover, N. Mex., and on some custom zinc carbonate ore from Leadville. The River Smelting & Refining Co.'s matting, fuming, and zinc oxide plant at Florence handled lead-zinc ore and concentrates from Colorado and Utah.

GARFIELD COUNTY

In 1926 the United States Vanadium Co.'s vanadium mines and mill were purchased by the Union Carbide & Carbon Corporation, of New York City, which formed a subsidiary to operate under the name of the United States Vanadium Corporation. The mill capacity was enlarged, by the addition of two new units, from 25 to 120 tons a day by December 1, 1926.

GILPIN COUNTY

The Gilpin County production of the five metals from lode and placer mines fell from a total gross of $128,458 in 1925 to $89,547 in 1926. A greater variety of ores was mined in 1926 than in any other year in the history of the county. Gold ore constituted 3,972 tons, silver ore 1,795 tons, lead ore 300 tons, lead-zinc ore 806 tons, gold-silver ore 270 tons, copper ore 20 tons, and zinc ore 44 tons. Placer mines near Black Hawk and Rollinsville produced 46.10 fine ounces of gold by sluicing.

Southern districts (Black Hawk, Central City, Nevadaville, Russell Gulch).—The southern districts of Gilpin County in 1926 produced 6,670 tons of ore, yielding $37,819 in gold, 37,853 ounces of silver, 11,150 pounds of copper, 241,700 pounds of lead, and 33,000 pounds of zinc, with a gross calculated value of $84,811. The three most important producing mines were the Eureka near Central City, the Two-Forty-Incidental group at Russell Gulch, and the Atlantic mine in the Hughesville district. The Eureka mine and 20-stamp amalgamation-concentration mill was operated by lessees. The Two-Forty-Incidental group was under lease to the Consolidated Metals Syndicate, which, in connection with the mine, also operated the Incidental amalgamation mill at Russell Gulch and the Midwest concentration mill at Black Hawk.

The silver ore of the Atlantic mine was treated at the Rose City No. 1 flotation mill, installed in the Iron City mill building below Black Hawk. This custom plant handled many small lots of various classes of ore from all parts of the county. The remainder of the mine production was made up from small lots of bullion, concentrates, and smelting ore from 33 mines. The list included the Coaley, Bryan Tunnel, Lucky No. 2, Jennie Blanche, Alaska, Peru, Snowden, Bonanza-Bonnell, Arizona-Morning Star, and Banta Hill. Development work was started in March, 1926, at the Concrete mine. The shaft was cleaned and repaired for 700 feet, and 525 feet of drifting was done on the 200, 400, and 500 foot levels. The Alps shaft house was repaired and an electric hoist installed; the shaft was repaired for 200 feet, and the west crosscut on the 200-foot level was cleaned out. Work on the Kansas Burroughs-Ophir Burroughs-Phoenix Burroughs group consisted of raising 40 feet from the Argo adit toward the bottom of the Phoenix shaft and of 220 feet of drifting on the Ophir.

Northern districts.—The northern districts produced 537 tons of ore, yielding $3,537 in gold, 245 ounces of silver, and 1,100 pounds of lead, with a total gross value of $3,778. The Perigo mine near Rollinsville, yielding amalgam bullion under stamps and plates and concentrates on tables, was the most important producer. Other producing mines were the Fontleroy, Newport-Providence, and Philadelphia.

At the Smuggler mine the spring and early summer months were spent in rehabilitating the buildings and machinery. From July 7 to the end of the year 382 feet were driven on the main adit. The mine is opened by 1,100 feet of inclines, shafts, and winzes; 1,900 feet of adit; 150 feet of crosscuts; and 3,500 feet of drifts. At the Free Gold mine of the Travis Gulch Mining Co. 500 feet of development work was done.

GRAND COUNTY

No production of metals was made in Grand County in 1926. Assessment and development work was done on the property of the Mt. Vasquez Mines Co. near Fraser. In the La Plata district at the Ready Cash group, in recent years a shipper of small lots of high-grade silver ore, 160 feet were driven in a new adit, making 450 feet completed in the new and 570 feet in the old adit.

GUNNISON COUNTY

Elk Mountains district.—A two-ton lot of silver ore was shipped from the Blue Streak-Flapper prospect north of Crested Butte.

Galena Mountain district.—Assessment work was done on claims on Galena Mountain near Schofield Pass.

Gold Brick district (*Ohio City*).—A short run of the Carter Mines Co.'s 20-stamp amalgamation-concentration mill at Ohio City yielded gold bullion. This property is opened by an 8,000-foot adit, a 1,200-foot raise, three shafts from 240 to 400 feet deep, and several thousand feet of drifts. A car of gold ore was shipped to the Leadville smelter from the Chicago-Climax group and two cars of gold ore from the Dodson.

Goose Creek district (*Madera*).—A small arsenic kitchen was operated for the manufacture of a weed eradicator from dump ore of the White Iron group near Madera siding.

Quartz Creek district (*Pitkin*).—One car of relatively high-grade silver ore was shipped to Leadville from the Mountain Boy mine and two cars of gold-silver ore from the Terrible mine. The Roosevelt adit was driven 600 feet, making the total length 4,970 feet.

Tomichi district (*Whitepine*).—Lessees on the Akron Mines Co.'s group shipped lead-zinc-copper-silver-gold sulphide ore to the International concentrator, Tooele, Utah, and lead-silver ore to the lead smelter, Midvale, Utah, and to the International lead plant, Tooele, Utah. Lead-zinc-copper-silver-gold sulphide ore was shipped from the Morning Star group to the United States Smelting, Refining & Mining Co.'s flotation plant, Midvale, Utah.

Vulcan, Spencer, Ruby, Italian Mountain, Spring Creek, Rock Creek, Cochetopa, Tincup, Taylor Park, and Beaver Creek districts.—No production and little development was done in these districts, former producers.

HINSDALE COUNTY

The total gross calculated value of the mine production of gold, silver, copper, lead, and zinc (in terms of recovered metals) in Hinsdale County in 1926 was $17,915, as compared with $62,207 in 1925. Dry gold and silver ore marketed amounted to 44 tons, lead ore to 162 tons, and lead-zinc ore to 114 tons. Producing mines were the Black Crook, California, Capitol City, Fanny Fern, Independence, Lellie, and Ute-Ulay mines.

JACKSON COUNTY

No development work was done at the Wolverine property near Pearl, from which copper ore was shipped in 1916 and 1917.

JEFFERSON COUNTY

No work was done at the Baxter Gap prospect or at the Malachite mine near Starbuck.

LAKE COUNTY

In Lake County the gross calculated value of mine production of metals increased from $2,862,625 in 1925 to $4,104,615 in 1926, or 43 per cent. There were increases in every metal except silver. Gold increased only $25,693; zinc increased in quantity from 7,460,000 to 22,324,000 pounds and in value from $566,960 to $1,674,300; lead increased in quantity from 13,888,000 to 18,545,000 pounds and in value from $1,208,256 to $1,483,600; and copper increased in quantity from 171,000 to 222,400 pounds and in value from $24,282 to $31,136. Silver decreased in quantity from 892,135 to 714,585 ounces and in value from $619,142 to $445,901. The total quantity of ore sold or treated decreased from 217,765 to 215,315 tons.

LEADVILLE DISTRICT

GENERAL FEATURES

Of the 215,315 tons of ore sold or treated in Lake County in 1926 215,115 tons came from the Leadville district. The metal yield in the Leadville district was 22,056.92 fine ounces of gold, 712,484 fine ounces of silver, 222,400 pounds of copper, 18,531,700 pounds of lead, and 22,324,000 pounds of zinc; the total calculated value was $4,088,519 out of a county total of $4,104,615.

Classification of Leadville ores in 1926

	Ore		Recovered content				
	Per-centage	Short tons	Gold	Silver	Copper	Lead	Zinc
Sulphide:			*Fine ounces*	*Fine ounces*	*Pounds*	*Pounds*	*Pounds*
Siliceous (carrying sulphides)[1]	1	1,663	3,959.40	3,263	5,083	11,339	------
Iron pyrites[2]	1	2,022	944.20	26,912	71,165	26,714	------
Lead (mostly iron excess)	4	7,563	451.80	95,071	3,274	1,089,329	------
Copper (excess silica)	1	1,224	423.90	30,457	118,890	9,599	------
Zinc-iron-lead	39	83,733	[3] 875.10	[3] 155,973	[3] 7,200	[4] 7,907,568	[5] 19,911,000
	46	96,205	6,654.40	311,676	205,612	9,044,549	19,911,000
Oxide (including low-sulphur ores):							
Siliceous gold	2	3,371	10,915.10	22,243	13,057	170,848	------
Siliceous silver	34	73,831	------	159,442	------	3,991,152	------
Lead (silica excess)	7	15,151	537.90	83,760	3,261	3,069,399	------
Lead (iron excess)	5	10,953	85.10	80,230	470	2,082,539	------
Iron-manganese-silver flux	2	7,455	------	54,258	------	173,213	------
Zinc	4	8,149	------	------	------	------	[5] 2,413,000
	54	118,910	11,538.10	399,933	16,788	9,487,151	2,413,000
Metal (sulphide and oxide)	------	------	3,864.42	875	------	------	------
	100	215,115	22,056.92	712,484	222,400	18,531,700	22,324,000

	Average recovery				
	Gold	Silver	Copper	Lead	Zinc
Sulphide:	*Ounces per ton*	*Ounces per ton*	*Per cent*	*Per cent*	*Per cent*
Siliceous (carrying sulphides)	2.381	1.96	0.15	0.34	------
Iron pyrites	.467	13.31	1.76	.66	------
Lead (mostly iron excess)	.060	12.57	.02	7.20	------
Copper (excess silica)	.346	24.88	4.86	.39	------
Zinc-iron-lead	[6] .019	[6] 3.48	------	[6] 8.25	[6] 19.34
Oxide (including low-sulphur ores):					
Siliceous gold	3.238	6.60	.19	2.53	------
Siliceous silver	------	2.16	------	2.70	------
Lead (silica excess)	.036	5.53	.01	10.13	------
Lead (iron excess)	.008	7.32	------	9.51	------
Iron-manganese-silver flux	------	7.28	------	1.16	------
Zinc	------	------	------	------	[6] 18.71

[1] Much highly siliceous and in all silica exceeds iron content. A dry gold and silver ore.
[2] Iron content exceeds silica content.
[3] Recovered in lead concentrates and in zinc residues.
[4] Recovered in lead concentrates, in zinc residues, and in leaded zinc oxide.
[5] Zinc in terms of recovered zinc in slab zinc, in zinc oxide, and in leaded zinc oxide.
[6] Original content, without deductions for losses. Lead wet assay.

During 1926 the A. V. lead bullion-copper matte smelter of the American Smelting & Refining Co., equipped with eight furnaces, was in continuous operation, but with no more than four furnaces in blast at any time and with only two in blast at the end of the year. The smelter treated Colorado ores and concentrates and zinc residues from Kusa and Henryetta, Okla., and Amarillo, Tex. As has been the custom for several years, this plant had to depend, when ore supplies slackened, upon using silver ore drawn from slag dumps of several old smelters, namely, the Adelaide, Bi-Metallic, Elgin, and Harrison Reduction works, and upon similar ore from the Chicago, Lida, and Olathe mine dumps; the supply of this material, however, is getting low.

The Colorado Zinc-Lead Co.'s 150-ton selective flotation mill, built in the last months of 1925 and in early 1926, was ready for full capacity operation in July, 1926, and gave a market for zinc-lead-iron-silver sulphide ores carrying in combined lead and zinc several points less than that demanded by the leaded zinc oxide plants of the Middle West and the East. The Western Zinc Oxide Co.'s Wetherill grate furnaces, operated on local low-grade zinc carbonate ores, were idle for three and one-half months in the spring and early summer because of lack of ore of this character. This plant purchases zinc carbonate ore carrying as low as 14 per cent zinc. Development and reopening of the Carbonate Hill-Graham Park mines resulted in the mining and shipment of 60,000 tons of zinc-lead-iron-silver sulphide ore and in addition silver-iron sulphide and zinc carbonate ores. These mines were reopened in part for mining about July, 1925, after an idleness for part of the area from October, 1918, and for part from April, 1919. Between September, 1923, and July, 1925, over 6,000,000,000 gallons of accumulated water was pumped from the workings of this group. The unwatering pumps were installed at both the Greenback and Pyrenees shafts. After unwatering it was found that the current flow was 1,400 gallons per minute. The McClain-Cary flotation mill in the Norton mill building was operated for a short period.

MINES REVIEW

Shipments of zinc-lead-iron-silver ore were made from the A. Y. & Minnie, Fanny Rawlings, Fortune, Iron Silver, Little Pittsburg-Little Chief group, New Monarch, Resurrection, and Yak mines, and from the Leadville Deep Mines Co.'s operations on the properties of the Western Mining Co. (Monte Christo, Wolftone, Agassiz), Empire Zinc Co. (Robert Emmett), Adams Mining Co. (Brookland, Moyamensing, and Clontarf), Iron Silver Mining Co. (Pyrenees), and the Leadville Deep Mines Co.'s Greenback claim. Shipments of lead sulphide with excess silica were made from the A. Y. & Minnie, Little Pittsburg, Luema, New Monarch, and Sunday mines and of lead sulphide with iron excess from the Leadville Deep Mines Co., Wm. Wallace, and Yak. Copper sulphide ore with excess silica was shipped from the Fanny Rawlings and the Ibex. Shipments of dry gold and silver sulphide ore, including both coarsely disseminated pyrite in siliceous gangue and heavy pyrite ore, were made from the Ibex mine. Dry gold sulphide ore, a coarsely disseminated pyrite in siliceous gangue, was shipped from the Little Vinnie.

Shipments of lead oxidized ore were made from A. Y. & Minnie, Chrysolite, Gilt Edge, Henriett, Highland Chief, Iron Hill group of the Iron Silver Mining Co., Leadville Deep Mines, Lilian, Little Pittsburg, Lucy B. Hussey lode (by Seventh Street Mining Co.), Luema, Louisville, Morning and Evening Star, Nevada, New Monarch, Resurrection, and Yak. Iron-manganese-silver oxide ore for fluxing was shipped from the Carbonate, Henriett, and Seneca. Iron-manganese-silver oxide ore for steel plants was shipped from the Carbonate, Morning and Evening Star, and Wm. Wallace mines. Siliceous oxide gold ores were shipped from the Breece, Ibex, and Little Vinnie mines. Zinc carbonate ores were shipped from the Chrysolite, Denver City, Fanny Rawlings, Henriett, Ibex, Iron-Silver group, Little Sliver, Louisville, Mahala, Morning and Evening Star, Robert E. Lee, William Wallace, and Yak mines. Specimen gold was shipped from the Fanny Rawlings, Ibex, and Little Vinnie mines.

The Leadville Deep Mines Co., which unwatered the Carbonate Hill-Graham Park area in 1925, shipped 70,000 tons of ore in 1926—from the Greenback mine, from the Western Mining Co.'s group, from the Empire Zinc Co.'s group, and from the Adams Mining Co.'s group. The operating shafts are the Greenback and the Pyrenees. Crosscuts will be driven to reopen the Iron Silver Mining Co.'s Graham Park properties. The Seventh Street Mining Co., operating through the Hibschle shaft, mined on the 414-foot level until July 25, 1926, when the slowly rising water of the down-town basin reached them; operations were then transferred to another level above. In the various properties reached by the Yak adit ore was mined on company account from the Cord, Ruby, and Habendum properties. Lessees continued to operate the Dolly B., White Cap, and Famous properties. Between 20 and 30 sets of lessees continued work on the Ibex group, which is opened by four shafts and over 50 miles of underground workings. This mine has in the past produced every variety of ore known to the Leadville district, but it is best known for its large production of gold since 1893. In 1926 the ores mined were chiefly for the gold content. The Henriett-Maid of Erin mine is opened by a 485-foot vertical shaft and by 3,216 feet of drifts. In 1926 drifts driven totaled 1,125 feet and a raise 215 feet.

OTHER DISTRICTS

Alicante, Colorado Gulch, Lake Creek, St. Kevin, and Sugar Loaf districts.—One car of dry gold and silver siliceous sulphide ore was shipped from the Black Iron mine, on Sugar Loaf Mountain. One car of lead-silver oxidized ore was shipped from the Confidence mine in Black Cloud Gulch, Lake Creek district. One car of dry gold siliceous oxidized ore was shipped from the White Eagle mine, Lake Creek district.

Arkansas River and tributaries placer districts.—The Mount Elbert Gold Dredging Co. operated the Derry Ranch dredge, which is equipped with buckets of 5 cubic feet capacity, from the middle of May to August 1.

Climax (*Tenmile district*).—The Climax Molybdenum Co.'s mill tonnage was gradually increased from 10,000 tons a month in January to 22,000 tons in December. The molybdenum ore is found in a brecciated pre-Cambrian granite surrounding a silicified core of the same granite. Shrinkage stopes 400 feet long, 200 feet high, and 200 feet wide, with requisite pillars, are being filled with ore, the daily tonnage milled being only the swell of the broken ore.

LA PLATA COUNTY

Dry gold ore, dry gold and silver ore, and dry silver ore from the La Plata district, totaling 119 tons, all sent direct to smelters and refiners, yielded $6,472 in gold and 2,681 ounces of silver, with a total calculated value of $8,145, as compared with a total for the district of $40,093 in 1925. The chief producing properties were the Mountain Meadow, Idaho group, Bessie G., and May Day.

Development work, including sinking the shaft, was done at the May Day. Assessment work only was done on the Eagle Pass claim, opened by a 1,000-foot adit. At the Gold King group, 1,000 feet of development work was done in 1926; the total development work amounts to 700 feet of adits and 550 feet of drifts. During 1926 at this group a 150-ton mill was under construction, with equipment of gyratory crushers, 50 stamps, ball mill, classifiers, and flotation machines.

LARIMER COUNTY

Development work was done at the prospect of the Cameron Pass Mining Co., near Cameron Pass. At the Iron King-Arizona group near Livermore assessment work was done.

MINERAL COUNTY

The metal output in 1926 from Mineral County mines (nearly all near Creede) was $672 in gold, 551,468 ounces of silver, and 354,700 pounds of lead from 8,855 tons of ore shipped to smelters. The producing mines near Creede were the Bachelor, Commodore-Sunnyside group, and New York-Last Chance-Volunteer group. Several cars of silver ore were shipped from the Equity group, 7 miles northwest of Creede on Willow Creek.

MOFFAT COUNTY

Small sluicing operations on Four Mile Creek, Moffat County, yielded 10.93 fine ounces of gold. The fineness varied from 0.949 to 0.953½ in gold and from 0.050 to 0.045 in silver.

MONTROSE COUNTY

Small sluicing operations on bench gravels of the Dolores and San Miguel Rivers below Naturita, Montrose County, yielded 6.38 fine ounces of gold. The fineness varied from 0.754 to 0.796¾ in gold and from 0.240 to 0.202 in silver.

OURAY COUNTY

Red Mountain district.—Eight mines in the Red Mountain district in 1926 produced 1,673 tons of ore, yielding $4,684 in gold, 14,447 ounces of silver, 196,400 pounds of copper, 263,900 pounds of lead, and 125,600 pounds of zinc, with a gross calculated value of $71,727, as compared with $67,482 in 1925. The Barstow 100-ton gravity-concentration mill was run during the summer on ore accumulated during the winter from the Barstow vein and its extension, the Imogene. The concentrates produced were lead-silver-gold, with some zinc. The decision of the ore purchasers determined whether or not the zinc was saved. In addition lead-zinc-silver-gold ore from both the Barstow and Imogene was shipped to custom flotation mills in the Salt Lake Valley, Utah. Lead-zinc-silver-gold ore from the Beaver-Belfast, Guston, and St. Paul mines was shipped to the Utah custom flotation plants. Lead-copper and copper-sulphide ores were shipped from the San Antonio group, and lead ore from the Guston.

Sneffels district.—After an interval of no production since June 30, 1916, and of no development work since 1920 the Camp Bird mine (productive from 1896 to 1916) was reopened on its upper levels in 1926 by lessees. The part of the mine under lease has approximately 5,000 feet of crosscuts, 35,000 feet of drifts, and 15,000 feet of raises. In 1926 the lessees drove 300 feet by hand drilling and nearly completed the mill construction and machinery installation of a 25-ton plate amalgamation-table concentration mill at the upper adit in Imogene Basin. In addition, the lessees mined and shipped gold ore containing some silver to the Golden Cycle mill at Colorado Springs, lead-zinc-silver milling ore to Tooele, Utah, and lead-gold-silver smelting ore to Leadville. Other operations in the Sneffels district resulted in the shipment of one car of lead-silver-gold smelting ore from the Atlas dump, "specimen" gold from the Governor mine, one car of lead-silver-gold smelting ore from the Mountain Top dump, and several cars of lead-silver-gold ore from the Revenue Tunnel dump.

Uncompahgre district.—At the Bachelor group, work in 1926 consisted almost entirely of development work, represented by 200 feet of raises, 1,994 feet of drifts, 175 feet of crosscuts, and 65 feet of raises. The property is opened by a 2,050-foot adit. Nearly 800 tons of lead-silver-gold ore, assaying 14 per cent lead and 75 ounces of silver to the ton, was taken out from the development adit and the raise. Lessees on the Black Girl mine shipped several cars of silver ore, carrying copper, and one car of copper-silver ore. The Mutual Gold Mines Co., operating the American Nettie-Pony Express-Jonathan group, drove 1,200 feet of drifts and raises and shipped smelting ore averaging 12 per cent lead and 70 ounces of silver to the ton from the Pony Express mine. One car of lead-silver smelting ore was shipped from the Micky Breen mine.

PARK COUNTY

Buckskin district.—One car of dry siliceous gold ore was shipped from the Paris mine to the Leadville smelter. Five men continued development throughout the year at the "Sweet Home" group.

Consolidated Montgomery district.—Less than one-half ton of gold ore was shipped from the No End mine, and several cars of lead-silver-gold ore were shipped from the Russia mine.

Fairplay district.—A small lot of placer gold with a gold fineness of 0.781¾ and a silver fineness of 0.179 was marketed in 1926.

Hall Valley district.—A small lot of high-grade gold-silver ore was shipped from the La Clede-Missouri group.

Mosquito district.—One car of dry siliceous gold ore was shipped from the Golden Wave and one car of lead-silver-gold ore from the Hock Hocking mine. The London Gold Mining Co. shipped several hundred tons of gold ore from the London mine from what is known locally as the South London. From the same mine, from stopes reached from the north adit, the Colorado Consolidated Mining Co., lessee, continued until April 1, 1926, the operations started in September, 1925. Relatively low-grade gold ore was treated in the lessee's amalgamation-gravity concentration-flotation mill. The London Gold Mining Co. also was engaged in driving an air connection from the main London workings to those of the London Extension Mining

Co.'s property—the Lulu, Flora A., and other claims—east of the London group.

Tarryall Creek district.—A small lot of placer gold with a gold fineness of 0.858 and a silver fineness of 0.134 was marketed in 1926.

PITKIN COUNTY

The gross calculated value of the silver, lead, and zinc recovered from ores and concentrates shipped from Pitkin County in 1926 was $446,043, as compared with $600,011 in 1925.

Avalanche district.—A 2-ton lot of lead ore was shipped from the Nyland prospect at Avalanche.

Roaring Fork district (*Aspen*).—All the mines on Aspen and Smuggler Mountains, under lease to the Aspen Mines Co. since 1924, reverted about July 1, 1926, to the owners, D. R. C. Brown and the Smuggler Leasing Co. In the interim between January 1 and July 1 the mines and the Smuggler concentration mill were operated. After July 1 local lessees operated the mines only, and the mill remained idle. Lead-silver and dry silver ore was shipped to the Leadville smelter from the "Spar Consolidated" group. The Newman Mining, Milling & Leasing Co. shipped lead-silver oxidized ore from its lease on the Percy La Salle group from old stopes. The Newman adit is 5,000 feet long. The Aspen Mines Co. and the Smuggler Leasing Co. mined from the Smuggler, Mollie Gibson, Aspen, Durant, and Late Acquisition mines dry silver ore, which was sent to the Smuggler mill, lead-silver oxidized smelting ore, and zinc-lead smelting ore. From the Della S.-Bushwhacker Alpine group, dry silver ore with some lead was milled, making lead-silver concentrates, and dry silver ore with a low content of lead was shipped to Leadville. One car of lead-silver oxidized ore was shipped from the Pioneer mine, and several hundred tons of lead-silver oxidized ore from the Pride of the Hills. The Park Tunnel Mining & Milling Co. shipped 1,600 tons of lead-silver ore from the Bob Ingersoll and Last Dollar mines. The "Park Tunnel" adit is 3,100 feet long. The Hope Mining, Milling & Leasing Co. shipped several hundred tons of dry silver ore containing some lead.

Woody Creek district.—Several hundred tons of lead-zinc-silver ore was shipped by the Aspen Contact Bimetallic Co. from the Aspen Contact group, on Woody Creek. This deposit is geologically an extension of the Smuggler Mountain horizons.

RIO GRANDE COUNTY

Summitville district.—Twenty-one tons of gold ore shipped in 1926 from the Little Annie mine at Summitville yielded 5,118.02 ounces of gold. The ore was free gold in quartz and was taken from the surface. One hundred feet of drifting was done in 1926. This district was discovered in 1870, and in the early days of Colorado the county was the third largest in the State in gold production.

SAGUACHE COUNTY

The gross calculated value of metals recovered from ore mined in Saguache County in 1926 was $578,513, as compared with $276,633 in 1925.

Blake district.—One car of copper oxidized ore was shipped from the Big Six prospect.

Kerber Creek district (*Bonanza*).—The Bonanza-Cocomongo 50-ton gravity concentration-flotation mill was operated from January 1 to May 1, 1926. Lead-zinc-silver ore was concentrated to lead-silver concentrates and lead-zinc-silver concentrates. After May 1 the mill was closed, and attention was directed to development only. The development work done in 1926 totaled 2,500 feet. The mine is opened by a 400-foot incline shaft. Several cars of oxidized ore carrying silver were shipped from the Essie-Little Jeff group. This oxidized ore carried 45 per cent silica, 11 per cent iron, and 18 per cent manganese. Lead-silver sulphide ore and lead-zinc-silver sulphide ore were shipped from the Golden Wave mine. In the spring of 1926 the Rawley mill, idle since December 1, 1923, was remodeled to make bulk flotation lead-copper-silver-gold concentrates, and from August 1 was operated continuously at the average rate of 330 tons in each 24 hours. The mill also handled some small lots from prospects in the district. The Rawley mine is opened by an adit 6,600 feet in length. Prior development had blocked out about 200,000 tons of ore; 1,478 feet of development work was done in 1926. The concentrates are carried by a 7¼-mile aerial tram to storage bins at Shirley on the Denver & Rio Grande Western Railroad's narrow-gauge Salida-Montrose branch. From Shirley the concentrates go to Salida, and are there transferred to broad-gauge cars for movement to the Leadville smelter. Copper-lead-silver-gold ore was shipped to smelter from the Rico mine and from the St. Louis mine.

SAN JUAN COUNTY

Animas district (*Silverton*).—The Animas district includes the area in the vicinity of Silverton and south and east of the Animas River from Silverton to Middleton. Small lots of smelting ore were shipped from 13 mines—the Acton, Aspen, Champion No. 2, Gray Eagle, Highland Mary, Iowa-Tiger, Katy, Lackawanna, Lark, Little Fanny-Philadelphia, Old Green Mountain, Senior Warden, and Wyman.

In the process of examination of the Shenandoah Dives, Dives Fraction, North Star, and Mayflower groups new development work was done in 1926 by Charles A. Chase as agent, and enough ore was found to warrant additional development. Development work was also done in 1926 on the Old Abe-Buffalo Boy group, with the expectation of resuming development in 1927. The Iowa-Tiger group, closed since 1923, except for minor work, was taken under option in March, 1926, by the Colorado-Mexico Mining Co., who proceeded to unwater the Melville shaft in order to examine the property.

Eureka district (*Silverton, Eureka*).—Producing mines in the Eureka district in 1926 were the Sunnyside, at Eureka, and the Aztec-Mountain Queen group, near Gladstone. The Aztec-Mountain Queen group is in San Juan County, but adjacent to the Red Mountain district, Ouray County. The ore, a lead-zinc-silver milling ore sent to Midvale, Utah, and a lead-silver smelting ore sent to Tooele, Utah, was shipped by way of Ouray. The Sunnyside 800-ton selective flotation plant of the United States Smelting, Refining & Mining Co. was operated 365 days in 1926. This plant was one of the first (in 1912) to use selective flotation in the treatment of a complex low-grade zinc-lead-copper-iron-silver-gold ore. In 1926 a high-grade zinc concentrate carrying also lead, copper, silver, and gold was shipped to Oklahoma-Texas zinc-retort plants (residues from the zinc retorts going to El Paso); a high-grade lead concentrate carrying more than half the recovered gold and silver went to the Durango lead smelter; and a zinc-lead middling carrying more gold than the zinc concentrate was shipped to the Read-Coolbaugh sulphating plant at the Durango smelter, where the soluble zinc sulphate was leached out, the residue being sent to the lead furnaces. Some of the zinc sulphate was sold to flotation plants throughout the United States, and some was sent to Amarillo, Tex., to be made into slab zinc after first being made into a zinc oxide. The flotation mill at Eureka is connected with the mine by a 17,000-foot aerial tram. Crushing is done both at the mine and at the mill. The mining is done by the shrinkage-stope method.

SAN MIGUEL COUNTY

The mines of San Miguel County produced a larger tonnage of ore in 1926 than in 1925, but the total gross calculated value of the five metals was less—$2,971,182 in 1926, as compared with $2,982,562 in 1925. The mine production in 1926 was 478,116 tons of ore, yielding $1,360,237 in gold, 1,206,277 ounces of silver, 255,900 pounds of copper, 9,981,900 pounds of lead, and 318,000 pounds of zinc.

Iron Springs district (*Ophir*).—The Ophir district in 1926 produced 28,591 tons of ore, yielding $12,774 in gold, 277,375 ounces of silver, 107,900 pounds of copper, and 2,332,400 pounds of lead, with a gross calculated value of $387,554, as compared with $283,607 in 1925. The two largest producing mines were the Carbonero and the San Bernardo. The Carbonero dry silver ore carrying some lead was treated in the 50-ton gravity concentration-flotation mill built on the property in 1924; the product, lead concentrates, was shipped to the Durango smelter. The Otto Mining Co. operated the San Bernardo mine and its 100-ton gravity concentration and flotation mill; lead concentrates were shipped to the Durango smelter. The Lazo Bisco Leasing Co. operated for a period the Butterfly-Terrible mine and amalgamation-gravity concentration mill; gold bullion was shipped to the Denver Mint and lead concentrates to the Durango smelter. Lead-silver smelting ore was shipped from the Fourth of July and Galena Girl mines. At the Silver Bell mine 600 feet of development work was done in 1926, and two cars of dry gold and silver smelting ore were shipped.

Upper San Miguel district (*Telluride*).—Six mines in the Upper San Miguel district in 1926 produced 449,525 tons of ore, yielding $1,347,463 in gold, 928,902 ounces of silver, 148,000 pounds of copper, 7,649,500 pounds of lead, and 318,000 pounds of zinc, with a gross calculated value of $2,583,628, as compared with $2,698,955 in 1925. The two by far most important producing mines were the Smuggler-Union and the Tomboy. Other producing mines were the Alta, Black Bear, Liberty Bell, and Nellie. Only 20 tons of ore was shipped to smelters; 444,732 tons went to amalgamation-concentration mills; 4,773 tons went to concentration mills.

The Smuggler-Union mills (650 tons daily capacity) consist of a 60-stamp plate amalgamation mill (built 1899) and a flotation mill (built 1920). Flotation concentrates in 1926 represented two-thirds of the concentrate product. The ore is given a preliminary crushing at the mine and carried by a 1-mile aerial tram to the mill.

The Tomboy 600-ton gravity concentration-flotation mill is built at the mine.

The production from the Liberty Bell was made by lessees. The Liberty Bell Gold Mining Co. was dissolved in 1920, but production was made by the company in 1921 and by lessees since that year.

The Black Bear mine constitutes one of the known ore reserves in the State of Colorado of low-grade complex gold-silver-copper-lead-zinc-iron ores. The blocking out of these ore bodies was done in 1922 to 1924, and production was made during these years by bulk flotation treatment at the Smuggler Union mill. The ore bodies of this mine were the inspiration for the development of the Read-Coolbaugh sulphating plant at the Durango smelter. Only 80 feet of development work was done in 1926 and only 30 feet in 1925, and production was nominal for both years.

The Alta mines and 150-ton gravity concentration-flotation mill have been operated by J. M. Wagner since the release in September, 1924, of the option held by the Belmont-Wagner Mining Co. In 1925, Wagner drove a raise from the mill adit level (which is 7,500 feet long) to connect with upper workings 400 feet above for ventilation.

The report of the Smuggler Union Mining Co. for the year ended April 30, 1927, says:

> The gross extracted value of ore produced during the year was $1,581,923.53. Freight and treatment amounted to $336,946.04, leaving a total net value of $1,244,977.49. Additional receipts incident to operations amounted to $4,849.89, making total gross receipts after deduction of freight and treatment charges, $1,249,827.38.
>
> The direct operating charges for the year amounted to $1,066,445.68. The indirect charges, including insurance and local taxes, amounted to $90,584.27. Boston office expenses, including salaries, administration, legal expense and taxes, amounted to $24,673.54 making a total cost of $1,181,703.49 and leaving a net profit for the year, not including in expenses any charges for depreciation, depletion or interest, of $68,123.89.
>
> Back interest of $9,732.28 was paid on outstanding bonds, notes, and stockholders' loans, which with interest paid and accrued on other indebtedness, made a total of $11,938.03, reduced by interest received to a net charge for the year of $10,629.19.
>
> The sum of $9,460.83 was spent for construction, and is carried as a capital account.
>
> For comparison, in the tabulation below, the figures for the two fiscal years are given:

Tonnage and metal contents and average prices received, Smuggler Union Mining Co., Colo., April 30, 1925, to April 30, 1927

Period	Tons milled [1]	Gold ounces	Price per ounce	Silver ounces	Price per ounce	Lead pounds	Price per pound	Copper pounds	Price per pound
April 30, 1926, to April 30, 1927	253, 975	45, 093	$20. 189	516, 865	$0. 550	6, 615, 908	$0. 0586	---------	---------
April 30, 1925, to April 30, 1926	224, 258	37, 984	20. 211	442, 544	. 646	5, 519, 201	. 066	2, 372	$0. 081

[1] The fiscal year 1926 includes some lessees' ore. In 1927, all ore produced was on company account.

A tabulation of the receipts and operating expenses (not including interest, depletion or depreciation) for the year, on the basis of tons produced by the company, with corresponding figures for the year preceding, for comparison, follows:

Receipts and operating expenses, Smuggler Union Mining Co., Telluride, Colo., fiscal years 1926 and 1927

Period	Year ended Apr. 30, 1927		Year ended Apr. 30, 1926	
Tonnage	253,975		218,449	
	Receipts	*Per ton*	*Receipts*	*Per ton*
Gross extracted value	$1,581,923.53	$6.229	$1,323,039.73	$6.056
Freight and treatment	336,946.04	1.327	291,011.67	1.332
Net value	1,244,977.49	4.902	1,032,028.06	4.724
Incidental receipts	4,849.89	.019	4,515.59	.021
Royalties			15,939.61	.073
Total receipts	1,249,827.38	4.921	1,052,483.26	4.818
	Expenses	*Per ton*	*Expenses*	*Per ton*
Direct operating charges	1,066,445.68	4.199	966,889.29	4.426
Indirect operating charges	90,584.27	.356	97,675.09	.447
Boston office expenses	24,673.54	.098	22,007.96	.101
Total operating expenses	1,181,703.49	4.653	1,086,572.34	4.974
Profit	68,123.89	.268	Loss: 34,089.08	.156

Development work at the Smuggler Union in 1926

	Feet
Drifting	5,284.9
Crosscutting	453.8
Raising	4,589.9
Total	10,328.6

This compares with 7,825 feet completed last year. In addition, 28,355 cubic feet of slabbing were done, compared with 43,076 cubic feet done last year.

Although new ore was exposed which to some extent took the place of that removed during the year, developments on the whole were not as encouraging as had been hoped for.

On the Flat vein about 9 level, drifts to the south, on 7, 8 and 9 levels have disclosed that, although the vein continues, the ore shoot which has been continuous for nearly 4,000 feet has apparently ended, and further development has been discontinued in this direction. There now remains in this section, only the stoping out of the ore in place, and removal of the broken reserve, an operation of less than a year at the present rate of production.

On the Flat vein below 9 level, No. 12 level was completed northward to its junction with stoped out ground, and exposed ore of mill grade for most of its length. Nos. 12, 13, 14 and 15 levels were all advanced south in the direction of, and under, the productive area above 9 level, above referred to, but so far developments have opened only intermittent patches of low grade ore. These unfavorable developments, together with the termination of the ore shoot above, have greatly restricted the possibilities for tonnage in this quarter.

On the "Combined Smuggler" and Flat veins, Nos. 13 and 15 levels were continued to the north and have opened ore of good grade, although there is evidence that the former, which is 1,100 feet south of the north boundary of the property, has reached the end of the ore shoot. The difficulties encountered in handling heavy ground in both of these levels have, however, made both stoping and development slow and expensive.

The Smuggler vein has been developed by drifts both north and south on 12 level, south on 13 level, and by drift and raise on 15 sublevel. Ore of good grade, but generally of narrow width, has been opened in all these developments, except for 15 sublevel, in which it is too low grade to pay at present.

Stoping has been done on the Ansborough vein from the old drift on that vein on 9 level. This work has opened ore of mill grade, containing low gold and silver and good lead values, but of somewhat erratic occurrence. As yet no steady production is looked for, but it is hoped that this will eventually replace the tonnage now coming from the Flat vein above 9 level.

That ore exists below the lowest level, No. 15, as mentioned in the last annual report, is proven by the developments on that level, which now have exposed a shoot of good mill grade for over 1,000 feet. Designs have been drawn for the shaft which will eventually reach this territory, but the cost, considering the present price of lead and silver, prevents its undertaking for the present.

Ore reserves estimated as of May 1, 1927

	Tons	Gross value per ton[1]
Broken ore:		
Flat vein above 9 level	29, 551	$6. 33
Ansborough	16	8. 38
Flat vein above 15 level	10, 103	5. 49
Combined vein above 15 level	17, 392	10. 81
	57, 062	7. 55
Unbroken ore:		
Blocked ore—		
Flat vein above 9 level	26, 864	6. 11
Flat vein above 15 level	23, 542	7. 65
Combined vein	71, 076	7. 15
Smuggler vein	44, 730	7. 50
Ansborough vein	2, 555	9. 80
	168, 767	7. 19
Partially blocked ore—		
Flat vein above 15 level	67, 246	6. 19
Combined vein	49, 127	6. 87
Smuggler vein	23, 512	7. 74
Ansborough vein	28, 961	9. 37
	168, 846	7. 15
Total ore in reserve	394, 675	7. 22
Total value:		
Broken ore	$430, 621	
Unbroken ore	2, 419, 662	
	2, 850, 283	

In the estimate division is made between blocked and partially blocked ore contrary to the last estimate, because the value of ore in the latter division is not in general so well established as it was last year, and in some cases is not immediately accessible. Nevertheless, ore of this class may reasonably be considered as positive reserve. No account is taken of possible ore from which new ore reserves must be developed, further than to say that areas exist, in the Ansborough vein between 9 and 5 levels, the Smuggler vein between 15 and 11 levels, the Combined vein below 15 level, and the Flat vein between 15 and 9 levels, in which ore is indicated, and which it is hoped will supply tonnage to take the place of that now in reserve.

For comparison, on May 1, 1926, reserves were reported as follows:

	Tons	Value per ton	
Broken ore	41, 005	$6. 30	
Unbroken ore	478, 736	6. 78	
Total	519, 741	6. 74	Total value, $3,504,283

From the above it is seen that the ore reserves have been diminished by 125,066 tons, but that the grade of ore in reserve has been increased by $0.48 per ton. These differences have been caused partly by failure to develop sufficient new ore to take the place of the 253,975 tons produced during the year, and partly by recalculation of quantity and value due to the elimination of 20 per cent of the tonnage in the form of waste discarded on the sorting tables, a factor which it has been possible to apply for the first time during this year. This has resulted as above seen, in lowering the tonnage and raising the grade of the ore in reserve.

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[1] Using prices of: $20.00 per ounce for gold ;$0.50 per ounce for silver ;$0.05 per pound for lead.

Financial statement, Smuggler Union Mining Co., April 30, 1926, and April 30, 1927

	April 30, 1926	April 30, 1927
Assets:		
Mines	$5,054,954.53	$5,054,954.53
Construction	1,480,670.05	1,490,130.88
San Miguel Development Co	349,109.32	339,109.32
Cash	8,901.04	98,046.21
Accounts receivable	117,308.98	107,932.29
Inventory	103,218.10	93,208.43
Accrued taxes, insurance, etc	19,598.59	14,186.50
Deficit	623,560.45	676,938.82
	7,757,321.06	7,874,506.98
Liabilities:		
Capital	5,000,000.00	5,000,000.00
Bonds	67,500.00	67,500.00
Notes payable	99,337.70	99,337.70
Accounts payable	90,608.79	88,371.27
Accrued interest and taxes	57,715.90	66,152.72
Iona property	1,872.55	1,872.55
Reserve for depreciation	839,633.58	950,620.20
Reserve for depletion	1,400,652.54	1,400,652.54
Paid in surplus	200,000.00	200,000.00
	7,757,321.06	7,874,506.98

The directors' report of the Tomboy Gold Mines Co. (Ltd.) for the year ended June 30, 1926, includes the report of the general manager at Telluride, dated July 19, 1926, excerpts of which are as follows:

Ore extracted at the mines.—A total gross of 241,264 tons was hauled from the Montana mine to the mill. From this total, 22,660.2 tons, or 9.39 per cent, were sorted out at the mill and discarded as waste, and 13,052.1 tons, or 5.41 per cent, were deducted for moisture content, leaving, with a gain in bin storage of 116 tons, a net total of 205,435.7 dry tons milled.

No further ore was drawn from the Argentine mine during the year.

One hundred per cent of the ore sent to the mill was drawn from the Montana mine and came from the several stope blocks, as follows:

A little further cleaning up of the No. 1–30 block was done and 296.3 tons were drawn.

From the No. 143–162 block, 110,557.4 tons were drawn, or 2,507.6 tons in excess of the content estimated a year ago, and still this block is not exhausted, as will be noted under "Ore reserve."

From the No. 170–184 block, 54,983.3 tons were drawn.

Miscellaneous cleaning up produced 43.8 tons of ore.

From below 1,750-foot level, 75,383.2 tons were trammed and hoisted through No. 128 hoistway. Of this tonnage, 72,139.2 tons were drawn from the No. 110–147 block, or 30,464.2 tons in excess of the estimated contents. This excess is chiefly due to the stoping of extra ore not included in last year's estimate, and to inability at that time to determine exact widths between walls where ore had been broken for many years. This tonnage practically exhausted all broken ore between 1,900-foot and 1,750-foot levels.

Three thousand two hundred forty-four tons of ore were trammed and hoisted from 2,050-foot level stope between No. 120 and No. 127. This ore constituted the shrinkage while this section was being stoped to within floor pillar distance of 1,900-foot level.

During the past year no new development of any sort was undertaken for the reason that all possibilities of the property have been thoroughly exhausted.

Ore reserves.—These stand as of July 1, 1926, at 75,570 tons total, and are composed of 48,895 tons of broken ore and 26,675 tons of unbroken ore.

Of the total reserve tonnage, 40,454 tons remain to be drawn from above 1,750-foot level. And of this 40,454 tons, 12,792 tons of broken ore together with 4,816 tons of unbroken pillars, lie south of No. 167 hoistway, and 17,637 tons of broken ore together with 5,209 tons of unbroken pillars, lie north of No. 167.

Below 1,750-foot level, the 2,050-foot level stope contains 16,466 tons of broken and 7,000 tons of unbroken ore. A small block of unstoped ore just south of No. 110 and above 1,900-foot level contains 3,825 tons, and the block just north of No. 77 raise contains 7,825 tons of unbroken probable ore between 1,900-foot and 1,750-foot levels.

Of the 241,264 tons of ore drawn during 1925–1926 from the mine, 30,804 tons were excess not included in the estimated reserve of 277,410 tons. Therefore, using last year's ore reserve figures there should remain but 66,950 tons. However, the estimate for 1926–1927 is based upon more actual measurements than have heretofore been possible, and is conservatively safe.

Just how much of this ore can be profitably milled, is uncertain, but assuming that it can all be milled and that some excess over that estimated will be drawn, all available ore is quite sure to be exhausted by the end of 1926.

The plant.—This, together with all outlying buildings and equipment, has been kept in first-class operating condition.

No additions were made and no new construction has been or will be necessary.

The electrically driven pump, assembled in our own shops, and used for pumping milling water from Argentine storage, worked out very satisfactorily and greatly relieved the overload on the compressor plant. The compressor plant, however, has been kept busy operating to full capacity supplying air for No. 128 hoist. This hoist, though old and well worn, has been kept in continuous operation and by careful attention we hope to make it last through the hoisting of all remaining ore from below 1,750-foot level.

Revenue and expenditure, year to June 30, 1926

	Per ton		
205,435.7 tons milled, yielding bullion worth			$175, 117. 62
And concentrate worth			547, 987. 51
			723, 105. 13
Sundry profit, boarding house, rents, etc			10, 946. 11
Royalty (from lessees)			1, 380. 13
			735, 431. 37
Mining and development expenses	$1. 36	$279, 492. 96	
Milling expenses	. 55	112, 778. 69	
Concentrating expenses (including transportation to railway)	. 57	116, 580. 18	
Water supply expenses	. 19	38, 247. 12	
Assay office expenses	. 02	4, 205. 88	
General expenses	. 25	52, 076. 62	
Taxes and insurance	. 21	43, 731. 45	
Total	3. 15		647, 112. 90
Profit			88, 318. 47

On December 25, 1926, the general manager posted a notice that the Tomboy mine would be closed down shortly. On February 3, 1927, at London, notice was given that "All active mining operations had ceased and that arrangements for cleaning up the plant and machinery, and the preparation of the necessary inventories and schedules with a view to the disposal of all the installation and stores, are in hand."

SUMMIT COUNTY

The total gross calculated value of metals produced by Summit County lode and placer mines in 1926 was $634,140, as compared with $688,638 in 1925. The decrease is mainly attributable to the falling off in dredge production at Breckenridge, for the increase in the lode output of the Montezuma district balanced the decrease in the output of lode mines at Breckenridge.

Breckenridge district.—The total calculated value of the combined output of lode and placer mines in the Breckenridge district in 1926 decreased 20 per cent from that in 1925. Both placer and lode mine gold and silver output decreased; the quantity and value of lead production decreased, but the quantity and value of zinc production increased; copper production, never very large, decreased heavily. The Wellington 100-ton gravity-concentration mill, equipped with rolls, jigs, and tables, was operated throughout the year. This wet mill makes lead concentrates and siliceous reject and a lead-zinc-iron middling. The middling is sent to a roaster and then to magnetic separators, thence to tables, the product being lead concentrates, zinc concentrates, and an iron reject. The mine is opened by a 550-foot vertical shaft from the surface and a 625-foot incline shaft starting underground. Another shaft starting from the surface is 125 feet deep, and adits, drifts, and crosscuts total 8 to 10 miles. Development work done in 1926 totaled 3,029 feet.

From the Detroit-Hicks mine several cars of gold and silver siliceous sulphide smelting ore and several hundred tons of lead-zinc-silver-gold sulphide milling ore were shipped. The Detroit mine is opened by a 160-foot shaft, 1,500 feet of drifts, and 650 feet of upraises, of which 250 feet of drifts and 200 feet of upraises were driven in 1926. The Hicks mine is opened by a 60-foot shaft, 500 feet of drifts, and 350 feet of upraises, of which 200 feet of drifts and 50 feet of upraises were driven in 1926. The Extension mine amalgamation-concentration mill was remodeled in 1926 but not operated until 1927. Development work was continued at the Royal Tiger mine, a total of 6,878 feet being driven in 1926. Mineral from the development work was tested at the company's mill, which is arranged for many different flow sheets. One car of dry silver ore carrying 70 per cent silica was shipped from the Fredonia-Monte Christo group on Bare Mountain, a spur of Mount Quandary.

One dredge, three hydraulic mines, and two sluice mines were in operation in 1926. The Bemrose-Bostwick placer on the Breckenridge side of Hoosier Pass was hydraulicked for a short period, as were the gravels on Mekka bench below Breckenridge. Sluicing operations also were only for short periods. The Tonopah Placers Co.'s No. 1 dredge (equipped with buckets of 9½ cubic feet) shut down in July, 1925, stood idle in its pool below Breckenridge during 1926. The Blue River Placer Mining Co.'s power-driven Yuba-type dredge with continuous bucket line of 88 buckets, each of 7½ cubic feet capacity, was under reconstruction from January 1 to September 16, 1926, and was in operation 108 days. This company operates under lease the B & L No. 1, B & L No. 2, Annie, ⅞ Bryan, and Fairview placer claims of the Long Island Mining Co.

Consolidated Tenmile district (*Frisco, Kokomo, and Robinson*).—The American Metal Co. cleaned out and retimbered (where necessary) the Wilfley, Kimberly, Delaware, and Uthoff adits at Kokomo and drove several raises to reach and sample zinc-lead-iron bodies reported as left in the area opened by these adits. In the company's judgment, insufficient ore was found to warrant the building of a mill or the continuation of development work, although a certain small tonnage of low-grade zinc-lead-iron ore was blocked out. Late in the year a lessee on the Wilfley property shipped several cars of lead-zinc ore. A car of dry silver ore carrying 74 per cent silica was shipped from the Golden Queen claim at Kokomo. From Frisco a small lot of lead-silver-gold smelting ore was shipped from the Etta mine.

Montezuma district.—In 1926 the Montezuma district produced 3,883 tons of ore, as compared with 337 tons in 1925. Lead-zinc-silver ore was shipped from the Bell (or California) mine to custom flotation plants at Midvale and Tooele, Utah. Ore of similar type was shipped to Midvale from the Keystone mine. During the winter of 1925–26 a 50-ton selective flotation mill was built at the St. John mine, and in 1926 the mill was operated for three months on lead-zinc-silver sulphide ore from the mine. From the Bullion mine 30 tons of ore carrying 6.66 per cent copper and 25 ounces of silver to the ton was shipped after the adit was cleaned up and a short winze sunk.

TELLER COUNTY

Mine and dump ore, slags, slimes, concentrates, and stolen bullion from the Cripple Creek district aggregated in recovered gold to Unites States mints and to smelters 214,592.08 fine ounces, valued at $4,436,012, as compared with $4,608,604 in 1925; and 25,609 ounces of silver, as compared with 29,683 ounces in 1925. The Golden Cycle mill at Colorado Springs, a roast-amalgamation-cyanidation plant with a daily capacity of 1,200 tons, ran steadily at 70 per cent capacity, mainly on ores from the Cripple Creek district. The mill also received gold ore in 1926 from Boulder, Clear Creek, Lake, and Ouray Counties, totaling less than 10,000 tons for the year. About 40,000 tons of dumps were removed from the Cripple Creek district to the Golden Cycle mill.

In the Cripple Creek district the Portland Gold Mining Co.'s Independence cyanidation and concentration mill, with a capacity of 700 tons in 24 hours, handled an average of 555 tons a day for 365 days. The operation of the Independence mill showed the following results, according to the annual printed report of the Portland Gold Mining Co. for the calendar year 1926:

Total input, including outside ores dry tons	202,596
Bullion sold	$826,236.65
Concentrates sold	144,129.83
By-products	503.05
	970,869.53
Total operating expense at Independence mill, including marketing of concentrates	523,034.63

The Dante small cyanidation mill was operated for a short period.

MINES REVIEW

Several thousand tons of low-grade ore was shipped in Poverty Gulch from the El Paso-Gold King-Rosetta group. One hundred feet of drifting and 50 feet of raises were driven.

On Tenderfoot Hill the Reclamation Metal Mining Co. shipped several hundred tons from the Black Diamond claim from a winze below the Sangre de Christo adit. The mine was operated from January 1 to April 5 and again from November 9 to December 31. During this period 690 feet of development work was done.

On Globe Hill the Stratton Leasing Co. began work at the Deerhorn in December. Some ore was shipped from the Hoosier claim just north of Globe Hill.

On the north slope of Ironclad Hill the producing mines were the Damon, Forest Queen, Jerry Johnson, W.P.H., and Wild Horse. Eight hundred feet of drifts were driven on the Jerry Johnson.

On Gold Hill a few cars of dump ore were shipped from the Anchoria Leland; several thousand tons of dump ore was shipped from the Midget mine and about 1,000 tons of crude ore from the Index group.

On Raven and Guyot hills the producing mines and dumps were the Cresson, Doctor-Jack Pot (dump), Elkton, Mary McKinney (dump), and Queen. Small shipments were made from the Economic dump. The annual report of the Cresson Consolidated Gold Mining & Milling Co. for the 12 months ended August 31, 1926 (dated January 10, 1927), says:

During the year 98,289 dry tons of ore were shipped, of a gross value of $1,377,849.31, averaging $14.01 per ton; the returns, less transportation and treatment, were $870,125.25, giving the ore a net value of $8.85 per ton. The company received as additional income the sum of $21,707.03 interest on bank deposits, making a grand total of $891,832.28, with total expenses of $614,755.54, resulting in a net gain from operations of $277,076.74. The total cost per ton of ore produced was $6.25. This is a decrease of 18 cents per ton over 1925.

You will note in our company's production of 98,289 dry tons, with an average return of $9.07 per ton, our entire cost was $6.25 per dry ton, resulting in a net profit of $2.82 per ton.

Total cash at the close of the fiscal year ending August 31, 1926, was $1,022,276.84.

The total cost of mining is divided as follows:

	Per ton
General expense	$0. 008
Taxes	. 470
Insurance	. 137
Salary officers	. 088
Colorado Springs office	. 097
Mining operations (includes mine management and engineering)	5. 450
	6. 250

On lower tonnage it is gratifying to see the mine cost the same as last year, for a much larger volume of water and increased depth usually mean increased costs.

While the total cost per ton is less than last year, it is on account of the value of the ore reducing our taxes.

The following is a summary of the company's development for the year ending August 31, 1926:

Development

	Feet
Drifts and crosscuts	6, 230
Raises	2, 044
Diamond drilling	2, 043½

The result of development work the last six months has been very good on practically all levels.

The upper levels, in new work, have a large tonnage of better than average grade.

The drifting on the 19 level and 20 level has been delayed by the volume of water, but with two additional pumps on 19, the drifts are being driven.

The shaft near the surface has been retimbered with 8x8 timber, treated with creosote, and is in first class condition.

Total production, Cresson Consolidated Gold Mining & Milling Co., Colo., 1903 to December 31, 1926

Period	Dry short tons	Gross value	Freight and treatment	Net value	Average gross value per ton	Average net value per ton	Dividends
1903 to Aug. 31, 1925	1,337,782	$27,264,248.11	$7,634,174.70	$19,630,073.41	$20.37	$14.67	
Sept. 1, 1925, to Aug. 31, 1926	98,289	1,377,849.31	507,724.06	870,125.25	14.01	8.85	
1903 to Aug. 31, 1926	1,436,071	28,642,097.42	8,141,898.76	20,500,198.66	19.94	14.27	
1903 to Dec. 31, 1926		29,132,800.75					$11,386,272.50

During April, May, and June, 1926, the Cresson mine produced 26,900 tons of $13.16 average gross value. Continued exploration of the nineteenth and twentieth levels during that quarter resulted in the development on the nineteenth level of an ore body about 80 feet in length, with a maximum width of 25 feet and an average shipping value of between $12 and $14 gross per ton. Operations on the nineteenth level were still retarded by the heavy flow of water, necessitating the pumping of 4,300 gallons per minute. During July, August, and September, 1926, the Cresson mine suffered a loss in earnings, for only 6,805 tons were hoisted in July, none was hoisted in August, and only 2,503 tons in September. Starting July 25 the retimbering of the shaft from the surface 300 feet downward required 57 days, and operation was resumed on September 20. In the fourth quarter of the calendar year the company produced about 30,000 tons of $15.57 average gross value, and the net returns were $156,242. Installation of additional pumps permitted work on the nineteenth level without delays; work was also done on the twentieth level, but delay was experienced whenever a new flow of water was opened.

On Beacon Hill shipments were made from the C. K. & N. dump, El Paso dump, Gold Dollar dump, and the Henry Adney dump. At the El Paso mine 800 feet of drifting was done.

Producing mines on Bull Hill were the American Eagles, Big Banta, Blue Bird dump, Dante, Dexter, Gold Sovereign dump, Trail, and Wild Horse. The Dante cyanidation mill was operated for a short period on dump ore from the Dante mine. At the Dexter mine 800 feet of drifts, crosscuts, and raises were driven. At the Gold Sovereign 150 feet of drifting and upraising were done. The Stratton lease on the Stratton Estate mines (on Bull, Globe, and Raven hills) reported development work from January 1 to December 11 on the American Eagles mine (and Findley mine, adjoining), totaling 3,406 feet of drifts and crosscuts and 750 feet of winzes and raises, and shipments of crude ore to the Golden Cycle mill. Work ceased on the American Eagles (Bull Hill) on December 15, and repair of the Abe Lincoln plant (Poverty Gulch) started December 12. Diamond drilling on the Deerhorn (Globe Hill) started on November 20.

Producing mines between Altman and Goldfield were the Acacia (Burns) dump, Free Coinage group dump, Deadwood, Empire Lee dump, Findley (through the American Eagles shaft on Bull Hill), Theresa, and Vindicator.

On Battle Mountain the producing mines were the Ajax, Granite, Portland-Independence-Last Dollar group, and Rose Nicol. The Granite Gold Mining Co. reported development in 1926 totaled 588 feet of drifts, 1,177 feet of crosscuts, 90 feet of raises, and 50 feet of winzes. The property is opened by the Gold Coin shaft, 1,300 feet deep; the Dillon shaft, 1,750 feet deep; and the Ajax shaft, 2,000 feet deep. The Granite Gold Mining Co. also operated under lease the X-10-U-8, Nellie V., and War Eagle claims on Squaw Mountain south of Battle Mountain.

The annual report of the Portland Gold Mining Co. for 1926 says:

> The mining and milling operations of your company were carried on during the past year with very satisfactory results.
>
> Notwithstanding three dividends of $60,000 each, paid during the last nine months of the year, in addition to the heavy expense of operation and development work carried on at great depth, the cash on hand December 31, 1926, was $498,013.81.
>
> The recent discovery on the twenty-sixth level of an apparently extensive body of a good grade of ore outside the previously known mineral area promises, when fully developed, to add materially to the ore reserves of your company.
>
> I herewith submit my report of the operation of the Portland, Independence, and Last Dollar mines and the Independence mill for the year 1926. Production from the various properties was as follows:
>
> | | |
> |---|---|
> | Portland mine: | |
> | Company ore to Golden Cycle mill | $495, 846. 49 |
> | Company ore to Independence mill | 18, 321. 09 |
> | Lessees' ore | 117, 777. 61 |
> | Last Dollar mine: | |
> | Company ore to Independence mill | 1, 073. 83 |
> | Lessees' ore | 157, 077. 35 |
> | Total shipping ore | 790, 096. 37 |
> | Estimated value of low-grade ore shipped to Independence mill | 805, 220. 25 |
> | Total production | 1, 595, 316. 62 |
>
> The mines and mill were operated at the following expense:
>
> | | |
> |---|---|
> | Operating expense at the Portland mine | $590, 242. 95 |
> | Operating expense at the Independence mine | 15, 818. 29 |
> | Operating expense at Last Dollar mine | 141, 807. 92 |
> | Operating expense at the Independence mill, including marketing concentrates | 523, 034. 63 |
> | Total operating expense | 1, 270, 903. 79 |
>
> | | |
> |---|---|
> | Total shipping ore as above | 790, 096. 37 |
> | Total mill recovery | 970, 869. 53 |
> | Miscellaneous earnings at mine and mill | 42, 768. 75 |
> | Gross returns | 1, 803, 734. 65 |
> | Less operating expense as above | 1, 270, 903. 79 |
> | | 532, 830. 86 |
> | Less general expense, including taxes, insurance, etc | 104, 185. 16 |
> | Net profit | 428, 645. 70 |
>
> The earnings for the year 1926 exceeded those of 1925 by $155,337.93, due to an increase in tonnage, average value, and slight decreases in operating costs.
>
> *Development work on Portland.*—During the year a winze was sunk from the thirtieth level approximately 135 feet. At this point we have cut a station and pump sump and are preparing to install three new pumps. A crosscut is being driven from this station at a point underneath the No. 2 shaft and it is our

intention to raise the shaft, as this method will be less costly than sinking. The pumps and motors should be installed by March 15, 1927, and we will then crosscut into the vein system on the thirty-first level.

The drifting done during the year on the vein system on the 3,000 level failed to disclose any new ore of consequence in excess of that reported last year.

We have opened a new stope in the south end of the 2,700 level on the contact or No. 1 vein. This stope is 225 feet long and is now being mined.

The existence of an ore body on the hanging wall side of the phonolite dyke on 2,700 level was reported last year. In following this ore upward it became evident that it continued at least to the 2,600 level. We therefore crosscut through the dyke at the extreme north end of the drift on the 2,600 level and encountered an ore body of large proportions and which may mean much for the future of the mine. At the crosscut this ore body is in excess of 40 feet and assays indicate that the screenings, which make about one-fourth of the volume, will average in excess of $25 to the ton. The reject will make a good grade of mill dirt.

Three drifts have been run on this ore and up to date 6 raises started. The longest drift is in ore approximately 250 feet. This drift has been driven ahead about 25 feet beyond this point but the values are low grade in this portion of the ore body. This drift gradually left the dyke and there is a possibility that there is more ore between it and the dyke. The values in the upraises are as good or better than on the level. The development work so far done indicates that the crosscut probably cut the ore at its widest point, but this has not yet been definitely determined.

The importance of this discovery must not be discounted. The area above is undeveloped. We know that the phonolite dyke exists on the twenty-first level and it is so intimately associated with the deposition of the ore below that there is reason to believe that this ore body should continue upward for some considerable distance.

A crosscut has been started on the 2,400 level and the present breast is about 200 feet from the point at which it should reach the ore body. We are also planning to crosscut this area on the twenty-seventh level. It seems logical that there must be other veins in that section which have junctioned to form the large ore body above.

Development on the Last Dollar.—The operation on the Last Dollar is almost entirely by lessees but we have aided some of the larger operators during the year so as to make this property more accessible from the Portland in order that we may be able to eventually discontinue the operation of the Last Dollar shaft. Connections now exist on the 1,700 and 2,100 foot levels. A large tonnage of low grade ore has been developed in this property and its operation has been profitable to your company during the past year.

Development on the Independence.—The drift into the Independence ground from the No. 2 Portland shaft was continued to a point opposite the Independence shaft and crosscuts were driven both ways from that point. The east crosscut encountered several veins of very promising appearance and in places good assays were obtained. The west crosscut is now being driven to connect with the workings on the bottom level of the Strong mine. This connection should be completed about April 1, and will provide ventilation which is now badly needed. Work in the east crosscut was discontinued until this connection was made. We plan to do further work in the vein system of the Independence as soon as the Strong connection is made and will also cut a station and raise the Independence shaft from the 2,100-foot level to its present sump. Our plan is to eventually concentrate all operations at the Independence so that the area around the No. 2 shaft can be caved.

Water.—The amount of water pumped from the mine continues practically unchanged. We are now pumping from the 2,700 and 3,000 foot levels about 950 gallons per minute. The water is pumped from the level directly to the drainage tunnel on the 2,100 level. The water from the 3,100 level, however, will have to be relayed from the sump on the 3,000 level.

Flotation unit at the Independence mill.—Perhaps the most outstanding improvement in the operation of the mill in many years should result from the installation of a flotation plant which will effect a saving of a portion of the values not heretofore recoverable from Cripple Creek ores by the present process. The new process we are installing was discovered by Mr. John M. Tippett, superintendent of the mill.

The United Gold Mines Co., controlling properties in various parts of the Cripple Creek district, reports a production of 90,861 tons from the Damon, Deadwood, Requa, Vindicator, Wild Horse, and W.P.H. groups and a total of 10,990 feet of development work in 1926.

About 100 tons of ore was shipped from the first 100 feet of the Plutocrat mine, a new discovery on Mineral Hill.

A small lot of ore was shipped from Block 8, School Section 16 on Bull Hill near Cameron.

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